

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Raymond Alejandro Examiner #: 76895 Date: 03/09/04
Art Unit: 1745 Phone Number 301 571 1272-1282 Serial Number: 09/994903
Mail Box and Bldg/Room Location: Remsen 6B-59 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Cathode Active Material for Non-Aqueous Electrolyte Secondary Cell & Process for
Producing the same
Inventors (please provide full names): Maceda et al

Earliest Priority Filing Date: 11/28/01

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please, search for subject matter of claim's 1-4 &
~~7~~ 7-10.

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Type of Search		Vendors and cost where applicable
Searcher: <u>ET</u>	NA Sequence (#) _____	STN <u>\$ 254.08</u>
Searcher Phone #: _____	AA Sequence (#) _____	Dialog _____
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Date Searcher Picked Up: _____	Bibliographic <u>(and)</u> <u>Dr.Link</u>	_____
Date Completed: <u>3-11-04</u>	Litigation _____	Lexis/Nexis _____
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Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: <u>70</u>	Other _____	Other (specify) _____

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FILE 'REGISTRY' ENTERED AT 09:48:34 ON 11 MAR 2004
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L1 FILE 'REGISTRY' ENTERED AT 08:58:50 ON 11 MAR 2004
38 S (LI(L)CO(L)MN(L)MG(L)O)/ELS (L) 5/ELC.SUB
SAV L1 ALE903/A

L2 FILE 'ZCA' ENTERED AT 09:01:22 ON 11 MAR 2004
15 S L1

L3 FILE 'CAOLD' ENTERED AT 09:01:47 ON 11 MAR 2004
0 S L2

L4 FILE 'HCAPLUS' ENTERED AT 09:29:56 ON 11 MAR 2004
33196 S MAEDA ?/AU
L5 4777 S FUJINO ?/AU
L6 50 S HATATANI ?/AU
L7 96133 S WATANABE ?/AU
L8 17153 S SUGIYAMA ?/AU
L9 109 S SADAMURA ?/AU
L10 4 S L4 AND L5 AND L6 AND L7 AND L8 AND L9
SEL L10 1-4 RN

L11 FILE 'REGISTRY' ENTERED AT 09:30:18 ON 11 MAR 2004
14 S E1-E14
L12 3 S L11 AND L1
L13 11 S L11 NOT L12
L14 5 S L13 AND 4/ELC.SUB

L15 FILE 'ZCA' ENTERED AT 09:33:14 ON 11 MAR 2004
82 S L14

L16 FILE 'HCAPLUS' ENTERED AT 09:34:04 ON 11 MAR 2004
15 S L2
L17 82 S L14
L18 QUE ELECTROD## OR CATHOD## OR ANOD##
L19 429969 S ELECTROLY?
L20 200186 S BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY? OR
L21 44136 S C(2A) (AXIS## OR AXES## OR AXIAL? OR DIRECTION? OR COORD
L22 76 S L17 AND L18 AND (L19 OR L20)
L23 3 S L22 AND L21
L24 22846 S LATTICE? (2A) CONST?

L25 1 S L17 AND L24

FILE 'REGISTRY' ENTERED AT 09:42:04 ON 11 MAR 2004

L26 1204 S (LI(L)CO(L)MN(L)O)/ELS

L27 295 S L26 (L) 4/ELC.SUB

FILE 'HCAPLUS' ENTERED AT 09:45:51 ON 11 MAR 2004

L28 458 S L27

L29 413 S L28 AND L18 AND (L19 OR L20)

L30 4 S L29 AND L21

L31 10 S L29 AND L24

L32 26 S L16 OR L23 OR L25 OR L30 OR L31

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FILE 'HCAPLUS' ENTERED AT 09:51:55 ON 11 MAR 2004

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=> d 132 1-26 cbib abs hitstr hitind

L32 ANSWER 1 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
2004:59635 Document No. 140:96915 Anode for lithium ion secondary
battery. Fukumoto, Yusuke; Hina, Yasuhiko; Inoue, Kaoru; Iwakura,
Tsuyoshi (Matsushita Electric Industrial Co., Ltd., Japan). U.S.
Pat. Appl. Publ. US 2004013942 A1 20040122, 12 pp. (English).
CODEN: USXXCO. APPLICATION: US 2003-614023 20030708. PRIORITY: JP
2002-198591 20020708.

AB A neg. electrode for a lithium ion secondary battery comprises a
material mixt. layer comprising a carbonaceous material comprising a
spherical natural graphite and a graphitized carbon fiber, wherein
the material mixt. layer has a carbon d. of not less than 1.6 g/cm³;
the spherical natural graphite has: (1) an interplanar spacing d002
between the (002) planes detd. by an X-ray diffraction pattern of
0.3354 to 0.3357 nm, (2) a mean particle circularity of not less
than 0.86, and (3) a mean particle size of 5 to 20 μ m; the
graphitized carbon fiber has: (1) a mean fiber length of 20 to 200
 μ m, and (2) a mean aspect ratio of 2 to 10; and the amt. of the
graphitized carbon fiber is 50 to 90% by wt. of whole of the
carbonaceous material.

IT **429678-65-9**, Cobalt lithium magnesium manganese oxide
(anode for lithium ion secondary battery)

RN 429678-65-9 HCAPLUS

CN Cobalt lithium magnesium manganese oxide (9CI) (CA INDEX NAME)

Component		Ratio		Component
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		Registry Number
O	x	17778-80-2
Co	x	7440-48-4
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2

- IC ICM H01M004-58
ICS H01M004-50; H01M004-48; H01B001-04
- NCL 429231800; 429231300; 429231600; 429231500; 429224000; 252182100;
252502000
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- IT 12190-79-3, Cobalt lithium oxide colio2 144470-86-0, Cobalt
lithium magnesium oxide Co0.8LiMg0.202 198213-69-3, Cobalt lithium
magnesium oxide Co0.99LiMg0.0102 198213-73-9, Cobalt lithium
magnesium oxide Co0.96LiMg0.0402 **429678-65-9**, Cobalt
lithium magnesium manganese oxide 642999-33-5, Cobalt lithium
magnesium zirconium oxide 642999-35-7, Cobalt indium lithium
magnesium oxide 642999-37-9, Cobalt lithium magnesium tin oxide
642999-39-1, Cobalt lithium magnesium oxide (Co0.6LiMg0.402)
642999-41-5, Aluminum cobalt lithium magnesium oxide
(Al0.01Co0.95LiMg0.0402) 642999-43-7, Aluminum cobalt lithium
magnesium oxide (Al0.02Co0.94LiMg0.0402) 642999-45-9, Cobalt
lithium magnesium zirconium oxide (Co0.95LiMg0.04Zr0.0102)
642999-47-1, Cobalt lithium magnesium zirconium oxide
(Co0.94LiMg0.04Zr0.0202) 642999-49-3, Aluminum cobalt lithium
magnesium oxide
(anode for lithium ion secondary battery)
- L32 ANSWER 2 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
- 2003:656286 Document No. 139:182871 Polymer lithium battery with ionic
electrolyte. Huang, Sui-Yang (USA). U.S. Pat. Appl. Publ. US
2003157409 A1 20030821, 10 pp. (English). CODEN: USXXCO.
APPLICATION: US 2003-368926 20030218. PRIORITY: US 2002-PV358593
20020221.
- AB There is disclosed a novel rechargeable lithium battery with ionic
electrolyte. The embodiments for the new polymer lithium ion
batteries in the present invention comprise three major components,
each of which is a composite: an anode, a cathode, and a
polymer-gel-electrolyte-separator system. The anode consists of a
lithium ion host such as graphite as active materials. The cathode
is a mixt. of lithium compds., high surface area carbon and
sometimes a catalyst. The polymer-gel-electrolyte-separator system
comprises inorg. electrolyte as active material, which is
immobilized in the polymer matrix. Two chemistries involved in
these embodiments of batteries include intercalation of lithium ions
and catalyzed electrolysis of lithium compds.

IT 429678-65-9, Cobalt lithium magnesium manganese oxide
 (polymer lithium battery with ionic electrolyte)
 RN 429678-65-9 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Co	x	7440-48-4
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2

IC ICM H01M010-40
 ICS H01M004-58; H01M004-62; H01M004-66; H01M004-50; H01M004-52
 NCL 429306000; 429231800; 429217000; 429245000; 429231950; 429223000;
 429224000; 429231100
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
 IT 554-13-2, Lithium carbonate 1308-38-9, Chromium oxide Cr_2O_3 , uses
 1309-37-1, Ferric oxide, uses 1310-65-2, Lithium hydroxide
 1313-13-9, Manganese dioxide, uses 1314-62-1, Vanadium oxide
 (V₂O₅), uses 1317-38-0, Copper oxide CuO , uses 7446-70-0,
 Aluminum chloride, uses 7447-41-8, Lithium chloride (LiCl), uses
 7632-51-1 7719-09-7, Thionyl chloride 7782-42-5, Graphite, uses
 7789-24-4, Lithium fluoride, uses 7790-69-4, Lithium nitrate
 7791-25-5, Sulfuryl chloride 9002-88-4, Polyethylene 9003-07-0,
 Polypropylene 9016-80-2, Polymethylpentene 10025-67-9, Sulfur
 chloride S_2Cl_2 10026-04-7 10377-48-7, Lithium sulfate
 10377-52-3, Trilithium phosphate 10545-99-0, Sulfur chloride SCl_2
 12017-00-4, Cobalt oxide CoO 12031-65-1, Lithium nickel oxide
 LiNiO_2 12031-80-0, Lithium oxide Li_2O 12057-17-9, Lithium
 manganese oxide LiMn_2O_4 12057-24-8, Lithium oxide (Li₂O), uses
 12057-29-3, Lithium phosphide Li_3P 12136-58-2, Lithium sulfide
 (Li₂S) 12190-79-3, Cobalt lithium oxide CoLiO_2 12678-32-9,
 Lithium phosphide Li_2P_5 14024-11-4, Lithium tetrachloroaluminate
 15955-98-3, Lithium tetrachlorogallate 18282-10-5, Tin dioxide
 21324-40-3, Lithium hexafluorophosphate 26134-62-3, Lithium
 nitride (Li₃N) 62852-65-7, Lithium decachlorodecaborate(2-)
 111853-04-4 177997-13-6, Aluminum Cobalt lithium nickel oxide
 182442-95-1, Cobalt lithium manganese nickel oxide 255063-53-7,
 Aluminum cobalt lithium nickel oxide $\text{Al}_{0.03}\text{Co}_{0.17}\text{LiNi}_{0.8}\text{O}_2$
 285136-11-0, Cobalt lithium manganese titanium oxide 301334-62-3,
 Chromium Cobalt lithium manganese oxide 429678-65-9,
 Cobalt lithium magnesium manganese oxide
 (polymer lithium battery with ionic electrolyte)

L32 ANSWER 3 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2003:454665 Document No. 139:24131 Secondary lithium battery. Okochi,
 Masaya; Kawatate, Yutaka; Tanaka, Ryoichi; Inoue, Kaoru (Matsushita
 Electric Industrial Co., Ltd., Japan). PCT Int. Appl. WO 2003049216
 A1 20030612, 31 pp. DESIGNATED STATES: W: CN, JP, KR, US; RW: AT,
 BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
 TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP12283
 20021125. PRIORITY: JP 2001-373271 20011206.

AB The battery has a cathode contg. an active mass and a binder, an
 anode, and a nonaq. electrolyte soln.; where the cathode active mass
 comprises a Li-contg. composite oxide: $\text{Li}_a(\text{Co}_{1-x}\text{Mg}_x\text{Mn}_y)\text{O}_c$ (M =
 Ni, Mn and/or Al; $a = 0-1.05$; $x = 0.005-0.025$; $y = 0-0.25$; $b =$
 $0.85-1.1$; and $c = 1.8-2.1$).

IT **536977-05-6**, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.93}\text{LiMg}_{0.02}\text{Mn}_{0.05}\text{O}_2$) **536977-06-7**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.83}\text{LiMg}_{0.02}\text{Mn}_{0.15}\text{O}_2$)
536977-07-8, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.73}\text{LiMg}_{0.02}\text{Mn}_{0.25}\text{O}_2$) **536977-08-9**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.68}\text{LiMg}_{0.02}\text{Mn}_{0.30}\text{O}_2$)
536977-18-1, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.94}\text{LiMg}_{0.01}\text{Mn}_{0.05}\text{O}_2$) **536977-19-2**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.84}\text{LiMg}_{0.01}\text{Mn}_{0.15}\text{O}_2$)
536977-20-5, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.74}\text{LiMg}_{0.01}\text{Mn}_{0.25}\text{O}_2$) **536977-21-6**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.69}\text{LiMg}_{0.01}\text{Mn}_{0.30}\text{O}_2$)
 (comps. of lithium cobalt magnesium oxides in cathodes for
 secondary lithium batteries)

RN 536977-05-6 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide ($\text{Co}_{0.93}\text{LiMg}_{0.02}\text{Mn}_{0.05}\text{O}_2$)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.93	7440-48-4
Mn	0.05	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 536977-06-7 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide ($\text{Co}_{0.83}\text{LiMg}_{0.02}\text{Mn}_{0.15}\text{O}_2$)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2

Co	0.83	7440-48-4
Mn	0.15	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 536977-07-8 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.73LiMg0.02Mn0.25O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.73	7440-48-4
Mn	0.25	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 536977-08-9 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.68LiMg0.02Mn0.3O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.68	7440-48-4
Mn	0.3	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 536977-18-1 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.94LiMg0.01Mn0.05O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.94	7440-48-4
Mn	0.05	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 536977-19-2 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.84LiMg0.01Mn0.15O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.84	7440-48-4
Mn	0.15	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 536977-20-5 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.74LiMg0.01Mn0.25O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.74	7440-48-4
Mn	0.25	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 536977-21-6 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.69LiMg0.01Mn0.3O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.69	7440-48-4
Mn	0.3	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-58
 ICS H01M004-02; H01M004-62; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 IT 12190-79-3, Cobalt lithium oxide (CoLiO2) 144419-56-7, Cobalt
 lithium magnesium oxide (Co0.95LiMg0.05O2) 198213-69-3, Cobalt
 lithium magnesium oxide (Co0.99LiMg0.01O2) 198213-70-6, Cobalt
 lithium magnesium oxide (Co0.98LiMg0.02O2) 198213-71-7, Cobalt
 lithium magnesium oxide (Co0.97LiMg0.03O2) 372491-79-7, Aluminum
 cobalt lithium magnesium oxide (Al0.05Co0.94LiMg0.01O2)
 536976-96-2, Cobalt lithium magnesium nickel oxide
 (Co0.93LiMg0.02Ni0.05O2) 536976-97-3, Cobalt lithium magnesium
 nickel oxide (Co0.88LiMg0.02Ni0.1O2) 536976-98-4, Cobalt lithium
 magnesium nickel oxide (Co0.78LiMg0.02Ni0.2O2) 536976-99-5, Cobalt

lithium magnesium nickel oxide ($\text{Co}_{0.73}\text{LiMg}_{0.02}\text{Ni}_{0.25}\text{O}_2$)
 536977-00-1, Cobalt lithium magnesium nickel oxide
 ($\text{Co}_{0.68}\text{LiMg}_{0.02}\text{Ni}_{0.30}\text{O}_2$) 536977-01-2, Aluminum cobalt lithium
 magnesium oxide ($\text{Al}_{0.05}\text{Co}_{0.93}\text{LiMg}_{0.02}\text{O}_2$) 536977-02-3, Aluminum
 cobalt lithium magnesium oxide ($\text{Al}_{0.15}\text{Co}_{0.83}\text{LiMg}_{0.02}\text{O}_2$)
 536977-03-4, Aluminum cobalt lithium magnesium oxide
 ($\text{Al}_{0.25}\text{Co}_{0.73}\text{LiMg}_{0.02}\text{O}_2$) 536977-04-5, Aluminum cobalt lithium
 magnesium oxide ($\text{Al}_{0.3}\text{Co}_{0.68}\text{LiMg}_{0.02}\text{O}_2$) **536977-05-6**,
 Cobalt lithium magnesium manganese oxide ($\text{Co}_{0.93}\text{LiMg}_{0.02}\text{Mn}_{0.05}\text{O}_2$)
536977-06-7, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.83}\text{LiMg}_{0.02}\text{Mn}_{0.15}\text{O}_2$) **536977-07-8**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.73}\text{LiMg}_{0.02}\text{Mn}_{0.25}\text{O}_2$)
536977-08-9, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.68}\text{LiMg}_{0.02}\text{Mn}_{0.30}\text{O}_2$) 536977-09-0, Cobalt lithium magnesium
 nickel oxide ($\text{Co}_{0.94}\text{LiMg}_{0.01}\text{Ni}_{0.05}\text{O}_2$) 536977-10-3, Cobalt lithium
 magnesium nickel oxide ($\text{Co}_{0.89}\text{LiMg}_{0.01}\text{Ni}_{0.10}\text{O}_2$) 536977-11-4, Cobalt
 lithium magnesium nickel oxide ($\text{Co}_{0.79}\text{LiMg}_{0.01}\text{Ni}_{0.20}\text{O}_2$)
 536977-12-5, Cobalt lithium magnesium nickel oxide
 ($\text{Co}_{0.74}\text{LiMg}_{0.01}\text{Ni}_{0.25}\text{O}_2$) 536977-13-6, Cobalt lithium magnesium
 nickel oxide ($\text{Co}_{0.69}\text{LiMg}_{0.01}\text{Ni}_{0.30}\text{O}_2$) 536977-14-7, Aluminum cobalt
 lithium magnesium oxide ($\text{Al}_{0.15}\text{Co}_{0.84}\text{LiMg}_{0.01}\text{O}_2$) 536977-15-8,
 Aluminum cobalt lithium magnesium oxide ($\text{Al}_{0.25}\text{Co}_{0.74}\text{LiMg}_{0.01}\text{O}_2$)
 536977-17-0, Aluminum cobalt lithium magnesium oxide
 ($\text{Al}_{0.3}\text{Co}_{0.69}\text{LiMg}_{0.01}\text{O}_2$) **536977-18-1**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.94}\text{LiMg}_{0.01}\text{Mn}_{0.05}\text{O}_2$)
536977-19-2, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.84}\text{LiMg}_{0.01}\text{Mn}_{0.15}\text{O}_2$) **536977-20-5**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.74}\text{LiMg}_{0.01}\text{Mn}_{0.25}\text{O}_2$)
536977-21-6, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.69}\text{LiMg}_{0.01}\text{Mn}_{0.30}\text{O}_2$)
 (comps. of lithium cobalt magnesium oxides in cathodes for
 secondary lithium batteries)

L32 ANSWER 4 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2003:187112 Document No. 138:404125 Preparation and crystal structure
 of $\text{Li}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ with the layered O_2 structure. Wei, Mi;
 Zhang, Hao; Yang, Wen-Sheng; Duan, Xue (Ministry of Education, Key
 Lab. of Sci. and Technol. of Controllable Chem. Reactions, Beijing
 University of Chemical Technology, Beijing, 100029, Peop. Rep.
 China). Wuji Huaxue Xuebao, 19(3), 267-272 (Chinese) 2003. CODEN:
 WHUXEO. ISSN: 1001-4861. Publisher: Wuji Huaxue Xuebao Bianjibu.
 AB Precursors of the type $\text{Na}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ were prepd. by solid
 state reaction of Na_2CO_3 and the composite metal oxides, then the
 layered materials of $\text{Li}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ were obtained by
 ion-exchange. Both the stoichiometric ratio of Na_2CO_3 to the
 composite metal oxides and the dopant content have strong influence
 on the structures of the precursors. In the case of Mg dopant, the
 structure of $\text{Na}_{0.60}[\text{Mg}_x\text{Mn}_{1-x}]\text{O}_2$ was affected by the Mg content.

Layered P2 structure was obtained when $x = 0.05$, while both P2 and orthorhombic structures were obtained when $x \geq 0.10$. For the compds. of $\text{Na}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ ($x = 0.05$, $0.05 \leq y \leq 0.20$), which have two metal dopants, the Co content has different effects on the structure. Both P2 and P3 layered structures were generated with low content of Co ($y = 0.05$). With the increase of Co content, the intensity of the diffraction peaks of P3 structure decreased, while those of P2 increased. Pure P2 structure was obtained at $y = 0.20$. The materials of $\text{Li}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ possess plate or bar-like morphol.

IT **530739-82-3**, Cobalt lithium magnesium manganese oxide
($\text{Co}_{0.05}\text{-Li}_{0.6}\text{Mg}_{0.05}\text{Mn}_{0.75}\text{-O}_{2.902}$)
(Prepn. and crystal structure of $\text{Li}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ with the layered O2 structure of battery cathode)

RN 530739-82-3 HCAPLUS

CN Cobalt lithium magnesium manganese oxide ($\text{Co}_{0.05}\text{-Li}_{0.6}\text{Mg}_{0.05}\text{Mn}_{0.75}\text{-O}_{2.902}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.05 - 0.2	7440-48-4
Mn	0.75 - 0.9	7439-96-5
Mg	0.05	7439-95-4
Li	0.6	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT **530739-82-3**, Cobalt lithium magnesium manganese oxide
($\text{Co}_{0.05}\text{-Li}_{0.6}\text{Mg}_{0.05}\text{Mn}_{0.75}\text{-O}_{2.902}$)
(Prepn. and crystal structure of $\text{Li}_{0.60}[\text{Mg}_x\text{Co}_y\text{Mn}_{1-x-y}]\text{O}_2$ with the layered O2 structure of battery cathode)

L32 ANSWER 5 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
2003:173992 Document No. 138:224204 Battery. Adachi, Momoe; Fujita, Shigeru; Endo, Takuya; Iwakoshi, Yasunobu; Shibamoto, Goro (Sony Corporation, Japan). PCT Int. Appl. WO 2003019713 A1 20030306, 162 pp. DESIGNATED STATES: W: CN, JP, KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP8498 20020823. PRIORITY: JP 2001-254547 20010824.

AB The battery has a cathode, contg. a Li composite oxide active mass having Li and/or Ni and O, an anode contg. a Li intercalating material and/or Li in its active mass, and an electrolyte-impregnated separator in between; where the battery has charging voltage ≥ 4.25 V, and a total amt. of Li carbonate and Li sulfate is 1.0 mass % of the cathode active mass. Preferably, the electrolyte has the concn. of a proton impurity ≤ 20 ppm and

water ≤ 20 ppm.
 IT 500867-92-5, Cobalt lithium magnesium manganese oxide
 (Co_{0.8}LiMg_{0.05}Mn_{0.15}O₂)
 (secondary lithium batteries contg. electrolytes, Li or
 Li-intercalating anodes and Li composite oxide cathodes with
 controlled concn. of Li₂CO₃ and Li₂SO₄)
 RN 500867-92-5 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co_{0.8}LiMg_{0.05}Mn_{0.15}O₂)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.8	7440-48-4
Mn	0.15	7439-96-5
Mg	0.05	7439-95-4
Li	1	7439-93-2

IC ICM H01M010-40
 ICS H01M004-02; H01M004-58; H01M004-40; H01M004-38
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 IT 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate
 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
 872-36-6, Vinylene carbonate 4427-96-7, Vinyl ethylene carbonate
 12031-65-1, Lithium nickel oxide (LiNiO₂) 113066-92-5, Cobalt
 lithium nickel oxide (Co_{0.9}LiNi_{0.1}O₂) 118557-79-2, Cobalt iron
 lithium oxide (Co_{0.9}Fe 0.1LiO₂) 128975-24-6, Lithium manganese
 nickel oxide (LiMn_{0.5}Ni_{0.5}O₂) 185746-84-3, Aluminum lithium
 magnesium nickel oxide (Al_{0.05}LiMg_{0.05}Ni_{0.9}O₂) 202916-35-6,
 Chromium cobalt lithium nickel oxide (Cr_{0.05}Co_{0.2}LiNi_{0.75}O₂)
 287718-97-2, Aluminum lithium manganese nickel oxide
 (Al_{0.05}LiMn_{0.05}Ni_{0.9}O₂) 346417-97-8, Cobalt lithium manganese
 nickel oxide (Co_{0.33}LiMn_{0.33}Ni_{0.33}O₂) 364589-12-8, Aluminum cobalt
 lithium titanium oxide (Al_{0.05}Co_{0.9}LiTi_{0.05}O₂) 475637-37-7,
 Aluminum cobalt lithium nickel oxide (Al_{0.05}Co_{0.8}LiNi_{0.15}O₂)
 478814-69-6, Aluminum cobalt lithium magnesium oxide
 (Al_{0.05}Co_{0.9}LiMg_{0.05}O₂) 500867-92-5, Cobalt lithium
 magnesium manganese oxide (Co_{0.8}LiMg_{0.05}Mn_{0.15}O₂) 500867-93-6,
 Aluminum iron lithium nickel oxide (Al_{0.15}Fe_{0.05}LiNi_{0.8}O₂)
 500867-94-7, Aluminum cobalt lithium nickel oxide
 (Al_{0.2}Co_{0.3}LiNi_{0.5}O₂) 500867-98-1, Cobalt lithium magnesium nickel
 oxide (Co_{0.45}LiMg_{0.05}Ni_{0.5}O₂) 500867-99-2, Cobalt lithium nickel
 titanium oxide (Co_{0.35}LiNi_{0.6}Ti_{0.05}O₂) 500868-00-8, Cobalt iron
 lithium nickel oxide (Co_{0.25}Fe_{0.1}LiNi_{0.65}O₂) 500868-01-9
 500868-02-0 500868-03-1 500868-04-2 500868-05-3 500868-09-7
 500868-10-0 500868-11-1 500868-12-2
 (secondary lithium batteries contg. electrolytes, Li or

Li-intercalating anodes and Li composite oxide cathodes with controlled concn. of Li_2CO_3 and Li_2SO_4)

- L32 ANSWER 6 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2003:172050 Document No. 138:224144 Secondary nonaqueous electrolyte battery. Nakai, Kenji; Koishigawa, Yoshitada; Hironaka, Kensuke (Shin-Kobe Electric Machinery Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003068282 A2 20030307, 21 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-372478 20011206. PRIORITY: JP 2001-180065 20010614.
- AB The battery has a coiled electrode-separator stack, contg. a cathode having an active mass paste comprising a spinel crystal structured Li Mn composite oxide, a conductor and a binder on both sides of a collector, a Li-intercalating carbonaceous anode, and a separator between the electrodes in a battery case; where the coating amt. of the oxide on each of the 2 sides of the collector is 80-120 g/m², and the mass of the conductor and the binder is resp. 10-12 % and 3-5 % of the cathode active mass paste. The battery has high safety while having high capacity and power output.
- IT 500912-95-8, Cobalt lithium magnesium manganese oxide ((Co,Mg)0.2Li1.01Mn1.79O4)
 (Li Mn oxide cathodes contg. conductors and binders with controlled amt. for secondary lithium batteries)
- RN 500912-95-8 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide ((Co,Mg)0.2Li1.01Mn1.79O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	4	17778-80-2
Co	0 - 0.2	7440-48-4
Mn	1.79	7439-96-5
Mg	0 - 0.2	7439-95-4
Li	1.01	7439-93-2

- IC ICM H01M004-02
 ICS H01M004-02; H01M004-58; H01M004-62; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- IT 7782-42-5, Graphite, uses 24937-79-9, PVDF 155472-68-7, Lithium manganese oxide (Li1.1Mn1.9O4) 156912-63-9, Lithium manganese oxide (Li1.03Mn1.97O4) 172922-65-5, Lithium manganese oxide (Li1.06Mn1.94O4) 176979-24-1, Lithium manganese oxide (Li1.12Mn1.88O4) 178404-38-1, Lithium manganese oxide (Li1.14Mn1.86O4) 500912-83-4, Aluminum lithium manganese oxide (Al0.2Li1.04Mn1.76O4) 500912-84-5, Lithium magnesium manganese oxide (Li1.04Mg0.2Mn1.76O4) 500912-85-6, Chromium lithium manganese oxide (Cr0.2Li1.01Mn1.79O4) 500912-86-7, Chromium

lithium manganese oxide (Cr0.2Li1.04Mn1.76O4) 500912-87-8,
 Chromium lithium manganese oxide (Cr0.2Li1.1Mn1.7O4) 500912-88-9,
 Chromium lithium manganese oxide (Cr0.2Li1.11Mn1.69O4)
 500912-89-0, Chromium lithium manganese oxide (Cr0.01Li1.04Mn1.95O4)
 500912-90-3, Chromium lithium manganese oxide (Cr0.3Li1.04Mn1.66O4)
 500912-91-4, Chromium lithium manganese oxide (Cr0.33Li1.04Mn1.63O4)
 500912-92-5, Lithium manganese nickel oxide (Li1.04Mn1.76Ni0.2O4)
 500912-93-6 500912-94-7 **500912-95-8**, Cobalt lithium
 magnesium manganese oxide ((Co,Mg)0.2Li1.01Mn1.79O4)
 (Li Mn oxide cathodes contg. conductors and binders with
 controlled amt. for secondary lithium batteries)

L32 ANSWER 7 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2002:945111 Document No. 138:26884 Secondary nonaqueous electrolyte
 battery. Imachi, Naoki; Nakane, Ikuo; Oikawa, Satoshi (Sanyo
 Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002358962 A2
 20021213, 18 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
 2001-164729 20010531.

AB The battery is a Li battery, where the cathode uses a layer
 structured Li_xMnCo_2 [$0.9 \leq x \leq 1.1$, $0.45 \leq a$
 ≤ 0.55 , $0.45 \leq b \leq 0.55$, $0.9 < (a+b) \leq 1.1$]
 active mass contg. Co Li oxide and/or spinel type Li Mn oxide.

IT **476320-62-4**, Cobalt lithium magnesium manganese oxide
 (Co0.5LiMg0.01Mn0.5O2) **476320-73-7**, Cobalt lithium
 magnesium manganese oxide (Co0.49LiMg0.02Mn0.49O2)
476321-04-7, Cobalt lithium magnesium manganese oxide
 (Co0.48LiMg0.05Mn0.48O2) **478001-16-0**, Cobalt lithium
 magnesium manganese oxide (Co0.48LiMg0.03Mn0.48O2)
 (cobalt lithium manganese oxide cathodes contg. lithium cobaltate
 and spinel type lithium manganese oxide for secondary lithium
 batteries)

RN 476320-62-4 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.5LiMg0.01Mn0.5O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.5	7440-48-4
Mn	0.5	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 476320-73-7 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.49LiMg0.02Mn0.49O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.49	7440-48-4
Mn	0.49	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 476321-04-7 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.48LiMg0.05Mn0.48O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.48	7440-48-4
Mn	0.48	7439-96-5
Mg	0.05	7439-95-4
Li	1	7439-93-2

RN 478001-16-0 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.48LiMg0.03Mn0.48O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	2	17778-80-2
Co	0.48	7440-48-4
Mn	0.48	7439-96-5
Mg	0.03	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-58
 ICS H01M004-02; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 IT 12057-17-9, Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt
 lithium oxide (CoLiO2) 118819-08-2, Cobalt lithium manganese oxide
 (Co0.5LiMn0.5O2) 476320-37-3, Cobalt lithium manganese titanium
 oxide (Co0.5LiMn0.5Ti0.01O2) 476320-49-7, Aluminum cobalt lithium
 manganese oxide (Al0.01Co0.5LiMn0.5O2) **476320-62-4**, Cobalt
 lithium magnesium manganese oxide (Co0.5LiMg0.01Mn0.5O2)
 476320-70-4, Aluminum cobalt lithium manganese oxide
 (Al0.02Co0.49LiMn0.49O2) **476320-73-7**, Cobalt lithium
 magnesium manganese oxide (Co0.49LiMg0.02Mn0.49O2) 476320-77-1,
 Cobalt lithium manganese tin oxide (Co0.49LiMn0.49Sn0.02O2)

476320-79-3, Cobalt lithium manganese titanium oxide
 (Co_{0.49}LiMn_{0.49}Ti_{0.02}O₂) 476320-80-6, Cobalt lithium manganese
 zirconium oxide (Co_{0.49}LiMn_{0.49}Zr_{0.02}O₂) 476320-86-2, Cobalt
 lithium manganese titanium oxide (Co_{0.48}LiMn_{0.48}Ti_{0.03}O₂)
 476320-89-5, Cobalt lithium manganese titanium oxide
 (Co_{0.48}LiMn_{0.48}Ti_{0.05}O₂) 476320-95-3, Aluminum cobalt lithium
 manganese oxide (Al_{0.05}Co_{0.48}LiMn_{0.48}O₂) **476321-04-7**,
 Cobalt lithium magnesium manganese oxide (Co_{0.48}LiMg_{0.05}Mn_{0.48}O₂)
 478001-11-5, Cobalt lithium manganese oxide (Co_{0.55}LiMn_{0.45}O₂)
 478001-12-6, Cobalt lithium manganese oxide (Co_{0.52}LiMn_{0.48}O₂)
 478001-13-7, Cobalt lithium manganese oxide (Co_{0.48}LiMn_{0.52}O₂)
 478001-14-8, Cobalt lithium manganese oxide (Co_{0.45}LiMn_{0.55}O₂)
 478001-15-9, Aluminum cobalt lithium manganese oxide
 (Al_{0.03}Co_{0.48}LiMn_{0.48}O₂) **478001-16-0**, Cobalt lithium
 magnesium manganese oxide (Co_{0.48}LiMg_{0.03}Mn_{0.48}O₂)
 (cobalt lithium manganese oxide cathodes contg. lithium cobaltate
 and spinel type lithium manganese oxide for secondary lithium
 batteries)

- L32 ANSWER 8 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2002:928103 Document No. 137:387175 Nonaqueous electrolyte lithium
 secondary battery. Imachi, Naoki; Nakane, Ikuro; Narukawa, Satoshi
 (Japan). U.S. Pat. Appl. Publ. US 2002182504 A1 20021205, 17 pp.
 (English). CODEN: USXXCO. APPLICATION: US 2002-158019 20020531.
 PRIORITY: JP 2001-164728 20010531.
- AB A nonaq. electrolyte secondary battery according to the invention
 comprises a pos. electrode contg. a pos. electrode active material
 including lithium contg. composite oxide having a layer crystal
 structure represented by a general formula of
 $\text{Li}_x\text{Mn}_a\text{Co}_b\text{Mg}_c\text{O}_2$ ($0.9 \leq x \leq 1.1$, $0.45 \leq a \leq 0.55$,
 $0.45 \leq b \leq 0.55$, $0 < c \leq 0.05$ and $0.9 < a+b+c \leq 1.1$
 are set and M is at least one kind selected from Al, Mg, Sn, Ti and
 Zr), a neg. electrode contg. a neg. electrode active material
 capable of intercalating and deintercalating lithium ion, a
 separator for sepg. the pos. electrode from the neg. electrode, and
 a nonaq. electrolyte.
- IT **476320-22-6**, Cobalt lithium magnesium manganese oxide
 (Co_{0.45-0.55}Li_{0.9-1.1}Mg_{0-0.05}Mn_{0.45-0.55}O₂)
 (nonaq. electrolyte lithium secondary battery)
- RN 476320-22-6 HCAPLUS
- CN Cobalt lithium magnesium manganese oxide (Co_{0.45-0.55}Li_{0.9-1.1}Mg_{0-0.05}Mn_{0.45-0.55}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.45 - 0.55	7440-48-4

Mn		0.45 - 0.55		7439-96-5
Mg		0 - 0.05		7439-95-4
Li		0.9 - 1.1		7439-93-2

IT **476320-57-7P**, Cobalt lithium magnesium manganese oxide
 (Co0.55LiMg0.01Mn0.45O2) **476320-59-9P**, Cobalt lithium
 magnesium manganese oxide (Co0.52LiMg0.01Mn0.48O2)
476320-62-4P, Cobalt lithium magnesium manganese oxide
 (Co0.5LiMg0.01Mn0.5O2) **476320-64-6P**, Cobalt lithium
 magnesium manganese oxide (Co0.48LiMg0.01Mn0.52O2)
476320-66-8P, Cobalt lithium magnesium manganese oxide
 (Co0.45LiMg0.01Mn0.55O2) **476320-73-7P**, Cobalt lithium
 magnesium manganese oxide (Co0.49LiMg0.02Mn0.49O2)
476321-01-4P, Cobalt lithium magnesium manganese oxide
 (Co0.49LiMg0.03Mn0.49O2) **476321-04-7P**, Cobalt lithium
 magnesium manganese oxide (Co0.48LiMg0.05Mn0.48O2)
 (nonaq. electrolyte lithium secondary battery)

RN 476320-57-7 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.55LiMg0.01Mn0.45O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Co	0.55	7440-48-4
Mn	0.45	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 476320-59-9 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.52LiMg0.01Mn0.48O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Co	0.52	7440-48-4
Mn	0.48	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 476320-62-4 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.5LiMg0.01Mn0.5O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component
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		Registry Number
		=====
O	2	17778-80-2
Co	0.5	7440-48-4
Mn	0.5	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 476320-64-6 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.48LiMg0.01Mn0.52O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
		=====
O	2	17778-80-2
Co	0.48	7440-48-4
Mn	0.52	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 476320-66-8 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.45LiMg0.01Mn0.55O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
		=====
O	2	17778-80-2
Co	0.45	7440-48-4
Mn	0.55	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 476320-73-7 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.49LiMg0.02Mn0.49O2)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
		=====
O	2	17778-80-2
Co	0.49	7440-48-4
Mn	0.49	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 476321-01-4 HCAPLUS

CN Cobalt lithium magnesium manganese oxide (Co0.49LiMg0.03Mn0.49O2)
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.49	7440-48-4
Mn	0.49	7439-96-5
Mg	0.03	7439-95-4
Li	1	7439-93-2

RN 476321-04-7 HCAPLUS
CN Cobalt lithium magnesium manganese oxide (Co0.48LiMg0.05Mn0.48O2)
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.48	7440-48-4
Mn	0.48	7439-96-5
Mg	0.05	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-50
ICS H01M004-52
NCL 429231100; 429224000; 429231300; 429231500; 429231600
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT 476320-20-4, Aluminum cobalt lithium manganese oxide
(Al0.05Co0.45-0.55Li0.9-1.1Mn0.45-0.55O2) **476320-22-6**,
Cobalt lithium magnesium manganese oxide (Co0.45-0.55Li0.9-1.1Mg0-
0.05Mn0.45-0.55O2) 476320-25-9, Cobalt lithium manganese tin oxide
(Co0.45-0.55Li0.9-1.1Mn0.45-0.55Sn0-0.05O2) 476320-27-1, Cobalt
lithium manganese titanium oxide (Co0.45-0.55Li0.9-1.1Mn0.45-0.55Ti0-
0.05O2) 476320-30-6, Cobalt lithium manganese zirconium oxide
(Co0.45-0.55Li0.9-1.1Mn0.45-0.55Zr0-0.05O2)
(nonaq. electrolyte lithium secondary battery)
IT 476320-32-8P, Cobalt lithium manganese titanium oxide
(Co0.5LiMn0.45Ti0.01O2) 476320-34-0P, Cobalt lithium manganese
titanium oxide (Co0.52LiMn0.48Ti0.01O2) 476320-37-3P, Cobalt
lithium manganese titanium oxide (Co0.5LiMn0.5Ti0.01O2)
476320-40-8P, Cobalt lithium manganese titanium oxide
(Co0.48LiMn0.52Ti0.01O2) 476320-42-0P, Cobalt lithium manganese
titanium oxide (Co0.45LiMn0.55Ti0.01O2) 476320-45-3P, Aluminum
cobalt lithium manganese oxide (Al0.01Co0.55LiMn0.45O2)
476320-47-5P, Aluminum cobalt lithium manganese oxide
(Al0.01Co0.52LiMn0.48O2) 476320-49-7P, Aluminum cobalt lithium

manganese oxide ($\text{Al}_{0.01}\text{Co}_{0.5}\text{LiMn}_{0.5}\text{O}_2$) 476320-51-1P, Aluminum
 cobalt lithium manganese oxide ($\text{Al}_{0.01}\text{Co}_{0.48}\text{LiMn}_{0.52}\text{O}_2$)
 476320-54-4P, Aluminum cobalt lithium manganese oxide
 ($\text{Al}_{0.01}\text{Co}_{0.45}\text{LiMn}_{0.55}\text{O}_2$) **476320-57-7P**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.55}\text{LiMg}_{0.01}\text{Mn}_{0.45}\text{O}_2$)
476320-59-9P, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.52}\text{LiMg}_{0.01}\text{Mn}_{0.48}\text{O}_2$) **476320-62-4P**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.5}\text{LiMg}_{0.01}\text{Mn}_{0.5}\text{O}_2$)
476320-64-6P, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.48}\text{LiMg}_{0.01}\text{Mn}_{0.52}\text{O}_2$) **476320-66-8P**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.45}\text{LiMg}_{0.01}\text{Mn}_{0.55}\text{O}_2$) 476320-70-4P,
 Aluminum cobalt lithium manganese oxide ($\text{Al}_{0.02}\text{Co}_{0.49}\text{LiMn}_{0.49}\text{O}_2$)
476320-73-7P, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.49}\text{LiMg}_{0.02}\text{Mn}_{0.49}\text{O}_2$) 476320-77-1P, Cobalt lithium manganese
 tin oxide ($\text{Co}_{0.49}\text{LiMn}_{0.49}\text{Sn}_{0.02}\text{O}_2$) 476320-79-3P, Cobalt lithium
 manganese titanium oxide ($\text{Co}_{0.49}\text{LiMn}_{0.49}\text{Ti}_{0.02}\text{O}_2$) 476320-80-6P,
 Cobalt lithium manganese zirconium oxide ($\text{Co}_{0.49}\text{LiMn}_{0.49}\text{Zr}_{0.02}\text{O}_2$)
 476320-86-2P, Cobalt lithium manganese titanium oxide
 ($\text{Co}_{0.48}\text{LiMn}_{0.48}\text{Ti}_{0.03}\text{O}_2$) 476320-89-5P, Cobalt lithium manganese
 titanium oxide ($\text{Co}_{0.48}\text{LiMn}_{0.48}\text{Ti}_{0.05}\text{O}_2$) 476320-93-1P, Aluminum
 cobalt lithium manganese oxide ($\text{Al}_{0.03}\text{Co}_{0.49}\text{LiMn}_{0.49}\text{O}_2$)
 476320-95-3P, Aluminum cobalt lithium manganese oxide
 ($\text{Al}_{0.05}\text{Co}_{0.48}\text{LiMn}_{0.48}\text{O}_2$) **476321-01-4P**, Cobalt lithium
 magnesium manganese oxide ($\text{Co}_{0.49}\text{LiMg}_{0.03}\text{Mn}_{0.49}\text{O}_2$)
476321-04-7P, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.48}\text{LiMg}_{0.05}\text{Mn}_{0.48}\text{O}_2$)
 (nonaq. electrolyte lithium secondary battery)

L32 ANSWER 9 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2002:745597 Document No. 138:240500 Electrochemical characteristics of
 partially cobalt-substituted $\text{LiMn}_2\text{-yCo}_y\text{O}_4$ spinels synthesized by
 Pechini process. Wu, She-huang; Su, Hsiang-Jui (Department of
 Materials Engineering, Tatung University, Taipei, 104, Taiwan).
 Materials Chemistry and Physics, Volume Date 2002, 78(1), 189-195
 (English) 2003. CODEN: MCHPDR. ISSN: 0254-0584. Publisher:
 Elsevier Science B.V..

AB Non-substituted $\text{Li}_x\text{Mn}_{204}$ with various Li/Mn ratios and
 Co-substituted $\text{LiMn}_2\text{-yCo}_y\text{O}_4$ spinels were prep'd. by the Pechini
 method. The precursors were calcined at 200° for 6 h
 followed by heat-treatment at 800° for 8 h. Cryst. structure
 and electrochem. characterization of the synthesized **cathode**
 materials for Li **batteries** were studied. The
 Co-substituted spinels had improved cycling properties in comparison
 to non-substituted spinels. $\text{LiMn}_{1.8}\text{Co}_{0.2}\text{O}_4$ had the most promising
 cycling performance with an initial sp. discharge capacity of 110
 mA-h/g and a fading rate of 0.5 mA-h/g per cycle (or 0.45% per
 cycle). The improvement in cycling performance may be due to the
 stabilization of the spinel structure by smaller **lattice**

const. when the Mn ion was partially substituted by Co³⁺.
 IT 12016-91-0, Cobalt lithium manganese oxide (Co_{0.5}LiMn_{1.5}O₄)
 130732-39-7, Cobalt lithium manganese oxide (Co_{0.4}LiMn_{1.6}O₄)
 130811-82-4, Cobalt lithium manganese oxide (Co_{0.2}LiMn_{1.8}O₄)
 146956-26-5, Cobalt lithium manganese oxide (Co_{0.1}LiMn_{1.9}O₄)
 146956-27-6, Cobalt lithium manganese oxide (Co_{0.3}LiMn_{1.7}O₄)
 180742-81-8, Cobalt lithium manganese oxide
 (Co_{0.05}LiMn_{1.95}O₄) 202824-12-2, Cobalt lithium manganese
 oxide (Co_{0.08}LiMn_{1.92}O₄)
 (electrochem. characteristics of LiMn_{2-y}Co_yO₂ spinels synthesized
 by Pechini process as **cathodes** for **batteries**)
 RN 12016-91-0 HCAPLUS
 CN Cobalt lithium manganese oxide (CoLi₂Mn₃O₈) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	8	17778-80-2
Co	1	7440-48-4
Mn	3	7439-96-5
Li	2	7439-93-2

RN 130732-39-7 HCAPLUS
 CN Cobalt lithium manganese oxide (Co_{0.4}LiMn_{1.6}O₄) (9CI) (CA INDEX
 NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.4	7440-48-4
Mn	1.6	7439-96-5
Li	1	7439-93-2

RN 130811-82-4 HCAPLUS
 CN Cobalt lithium manganese oxide (Co_{0.2}LiMn_{1.8}O₄) (9CI) (CA INDEX
 NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.2	7440-48-4
Mn	1.8	7439-96-5
Li	1	7439-93-2

RN 146956-26-5 HCAPLUS
 CN Cobalt lithium manganese oxide (Co_{0.1}LiMn_{1.9}O₄) (9CI) (CA INDEX
 NAME)

NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.9	7439-96-5
Li	1	7439-93-2

RN 146956-27-6 HCAPLUS

CN Cobalt lithium manganese oxide (Co0.3LiMn1.7O4) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.3	7440-48-4
Mn	1.7	7439-96-5
Li	1	7439-93-2

RN 180742-81-8 HCAPLUS

CN Cobalt lithium manganese oxide (Co0.05LiMn1.95O4) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.05	7440-48-4
Mn	1.95	7439-96-5
Li	1	7439-93-2

RN 202824-12-2 HCAPLUS

CN Cobalt lithium manganese oxide (Co0.08LiMn1.92O4) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.08	7440-48-4
Mn	1.92	7439-96-5
Li	1	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium manganese oxide spinel prepn Pechini process; cobalt lithium

manganese oxide spinel prepn Pechini process; **cathode**
cobalt lithium manganese oxide spinel **battery**

IT **Battery cathodes**

(electrochem. characteristics of $\text{LiMn}_{2-y}\text{Co}_y\text{O}_2$ spinels synthesized by Pechini process as **cathodes** for **batteries**)

IT **12016-91-0**, Cobalt lithium manganese oxide ($\text{Co}_{0.5}\text{LiMn}_{1.5}\text{O}_4$)
12057-17-9, Lithium manganese oxide (LiMn_2O_4) 110665-91-3, Lithium manganese oxide ($\text{Li}_{1.2}\text{Mn}_2\text{O}_4$) 126941-22-8, Lithium manganese oxide ($\text{Li}_{0.8}\text{Mn}_2\text{O}_4$) 130242-30-7, Lithium manganese oxide ($\text{Li}_{1.1}\text{Mn}_2\text{O}_4$)
130732-39-7, Cobalt lithium manganese oxide ($\text{Co}_{0.4}\text{LiMn}_{1.6}\text{O}_4$)
130811-82-4, Cobalt lithium manganese oxide ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$)
146956-26-5, Cobalt lithium manganese oxide ($\text{Co}_{0.1}\text{LiMn}_{1.9}\text{O}_4$)
146956-27-6, Cobalt lithium manganese oxide ($\text{Co}_{0.3}\text{LiMn}_{1.7}\text{O}_4$)
180742-81-8, Cobalt lithium manganese oxide ($\text{Co}_{0.05}\text{LiMn}_{1.95}\text{O}_4$) **202824-12-2**, Cobalt lithium manganese oxide ($\text{Co}_{0.08}\text{LiMn}_{1.92}\text{O}_4$)

(electrochem. characteristics of $\text{LiMn}_{2-y}\text{Co}_y\text{O}_2$ spinels synthesized by Pechini process as **cathodes** for **batteries**)

L32 ANSWER 10 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN

2002:522252 Document No. 137:96276 Cathode active material and nonaqueous electrolyte secondary battery. Tanaka, Takehiko; Hosoya, Yosuke; Yamamoto, Yoshikatsu; Suzuki, Kiyohiko; Koga, Keizo (Sony Corporation, Japan). PCT Int. Appl. WO 2002054512 A1 20020711, 62 pp. DESIGNATED STATES: W: CN, KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2001-JP11303 20011221. PRIORITY: JP 2000-403455 20001228; JP 2000-403460 20001228; JP 2000-403463 20001228.

AB The material comprises a composite metal oxide compd. of formula: $\text{Li}_m\text{M}_x\text{M}_1\text{yM}_2\text{zO}_2$ where M = Co, Ni or Mn, M_1 = Al, Cr, V, Fe, Cu, Zn, Sn, Ti, Mg, Sr, B, Ga, In, Si or Ge; M_2 = Mg, Ca, B or Ga; $x=0.9-1$, $y=0.001-0.5$, $z=0-0.5$ and $m \geq 0.5$. Another material comprises a lithium manganese composite oxide of formula $\text{Li}_s\text{Mn}_2-\text{tMatO}_4$ where $\text{Ma} = \text{Fe, Co, Ni, Cu, Zn, Al, Sn, Cr, V, Ti, Mg, Ca, Sr, B, Ga, In, Si and/or Ge}$; $s \geq 0.9$, and $t=0.01-0.5$. The material allows the suppression of the temp. increasing when overcharging and maintains the cell capacity at a high level.

IT **372491-98-0**, Cobalt lithium magnesium manganese oxide ($\text{Co}_{0.98}\text{LiMg}_{0.01}\text{Mn}_{0.01}\text{O}_2$)
(substituted; Cathode active material contg. lithium transition metal composite oxide for nonaq. electrolyte secondary battery)

RN 372491-98-0 HCAPLUS

CN Cobalt lithium magnesium manganese oxide ($\text{Co}_{0.98}\text{LiMg}_{0.01}\text{Mn}_{0.01}\text{O}_2$)
(9CI) (CA INDEX NAME)

Component	Ratio	Component
		Registry Number

=====+=====+=====			
O		2	17778-80-2
Co		0.98	7440-48-4
Mn		0.01	7439-96-5
Mg		0.01	7439-95-4
Li		1	7439-93-2

- IC ICM H01M004-58
ICS H01M010-40; H01M004-02
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- IT 372491-92-4, Aluminum calcium cobalt lithium oxide
(Al_{0.01}Ca_{0.01}Co_{0.98}LiO₂) 372491-97-9, Cobalt lithium magnesium
vanadium oxide (Co_{0.98}LiMg_{0.01}V_{0.01}O₂) **372491-98-0**, Cobalt
lithium magnesium manganese oxide (Co_{0.98}LiMg_{0.01}Mn_{0.01}O₂)
372491-99-1, Cobalt iron lithium magnesium oxide
(Co_{0.98}Fe_{0.01}LiMg_{0.01}O₂) 372492-00-7, Aluminum cobalt lithium
magnesium oxide (Al_{0.01}Co_{0.98}LiMg_{0.01}O₂) 441311-31-5, Aluminum
cobalt lithium magnesium oxide (Al_{0.03}Co_{0.98}LiMg_{0.01}O₂)
441311-33-7, Cobalt lithium oxide (Co_{0.98}LiO₂) 441311-34-8,
Aluminum cobalt lithium magnesium oxide (Al_{0.05}Co_{0.98}LiMg_{0.05}O₂)
441311-35-9, Aluminum cobalt lithium magnesium oxide
(Al_{0.07}Co_{0.98}LiMg_{0.07}O₂)
(substituted; Cathode active material contg. lithium transition
metal composite oxide for nonaq. electrolyte secondary battery)
- L32 ANSWER 11 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
2002:426705 Document No. 136:404311 Process for producing
cathode active material for nonaqueous **electrolyte**
secondary **battery**. Maeda, Hideaki; Fujino, Shoichi;
Hatatani, Mitsuaki; Watanabe, Hiroyasu; Sugiyama, Norimiki;
Sadamura, Hideaki (Toda Kogyo Corporation, Japan). Eur. Pat. Appl.
EP 1211741 A2 20020605, 16 pp. DESIGNATED STATES: R: AT, BE, CH,
DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV,
FI, RO, MK, CY, AL, TR. (English). CODEN: EPXXDW. APPLICATION: EP
2001-309960 20011128. PRIORITY: JP 2000-363511 20001129.
- AB A **cathode** active material for a nonaq. **electrolyte**
secondary cell of the present invention, having a
c-axis length of **lattice const**
. of 14.080 to 14.160 Å, an av. particle size of 0.1 to 5.0
µm, and a compn. represented by the formula: LiCo(1-x-y)Mn_xMg_yO₂
wherein x is a no. of 0.008 to 0.18; and y is a no. of 0 to 0.18.
- IT **142447-11-8P**, Cobalt lithium manganese oxide
Co_{0.85}LiMn_{0.15}O₂ **142447-12-9P**, Cobalt lithium manganese
oxide Co_{0.95}LiMn_{0.05}O₂ **142447-14-1P**, Cobalt lithium
manganese oxide Co_{0.98}LiMn_{0.02}O₂ **214536-41-1P**, Cobalt
lithium manganese oxide **267411-54-1P**, Cobalt lithium
manganese oxide Co_{0.99}LiMn_{0.01}O₂ **372491-98-0P**, Cobalt
lithium magnesium manganese oxide Co_{0.98}LiMg_{0.01}Mn_{0.01}O₂

429678-65-9P, Cobalt lithium magnesium manganese oxide

429678-66-0P, Cobalt lithium magnesium manganese oxide

(Co_{0.9}LiMg_{0.05}Mn_{0.05}O₂)

(process for producing **cathode** active material for

nonaq. **electrolyte** secondary **battery**)

RN 142447-11-8 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.85}LiMn_{0.15}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.85	7440-48-4
Mn	0.15	7439-96-5
Li	1	7439-93-2

RN 142447-12-9 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.95}LiMn_{0.05}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.95	7440-48-4
Mn	0.05	7439-96-5
Li	1	7439-93-2

RN 142447-14-1 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.98}LiMn_{0.02}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.98	7440-48-4
Mn	0.02	7439-96-5
Li	1	7439-93-2

RN 214536-41-1 HCAPLUS

CN Cobalt lithium manganese oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2

Co		x		7440-48-4
Mn		x		7439-96-5
Li		x		7439-93-2

RN 267411-54-1 HCAPLUS
 CN Cobalt lithium manganese oxide (Co_{0.99}LiMn_{0.01}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.99	7440-48-4
Mn	0.01	7439-96-5
Li	1	7439-93-2

RN 372491-98-0 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co_{0.98}LiMg_{0.01}Mn_{0.01}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.98	7440-48-4
Mn	0.01	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 429678-65-9 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Co	x	7440-48-4
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2

RN 429678-66-0 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co_{0.9}LiMg_{0.05}Mn_{0.05}O₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

O		2		17778-80-2
Co		0.9		7440-48-4
Mn		0.05		7439-96-5
Mg		0.05		7439-95-4
Li		1		7439-93-2

IC ICM H01M004-52
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST nonaq **battery cathode** active material prepn;
 lithium cobalt manganese magnesium oxide **cathode**
battery

IT **Battery cathodes**
 Grain size
 Particle size
 Secondary **batteries**
 Surface area

(process for producing **cathode** active material for
 nonaq. **electrolyte** secondary **battery**)

IT **142447-11-8P**, Cobalt lithium manganese oxide
 $\text{Co}_{0.85}\text{LiMn}_{0.15}\text{O}_2$ **142447-12-9P**, Cobalt lithium manganese
 oxide $\text{Co}_{0.95}\text{LiMn}_{0.05}\text{O}_2$ **142447-14-1P**, Cobalt lithium
 manganese oxide $\text{Co}_{0.98}\text{LiMn}_{0.02}\text{O}_2$ **214536-41-1P**, Cobalt
 lithium manganese oxide **267411-54-1P**, Cobalt lithium
 manganese oxide $\text{Co}_{0.99}\text{LiMn}_{0.01}\text{O}_2$ **372491-98-0P**, Cobalt
 lithium magnesium manganese oxide $\text{Co}_{0.98}\text{LiMg}_{0.01}\text{Mn}_{0.01}\text{O}_2$
429678-65-9P, Cobalt lithium magnesium manganese oxide
429678-66-0P, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.9}\text{LiMg}_{0.05}\text{Mn}_{0.05}\text{O}_2$)

(process for producing **cathode** active material for
 nonaq. **electrolyte** secondary **battery**)

L32 ANSWER 12 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2002:395307 Document No. 137:188161 Preparation and characterization
 of spinel $\text{LiCo}_x\text{Mn}_{2-x}\text{O}_4$ by oxalate precipitation. Lee, Byeong Woo
 (Department of Materials Engineering, Korea Maritime University,
 Pusan, 606-791, S. Korea). Journal of Power Sources, 109(1),
 220-226 (English) 2002. CODEN: JPSODZ. ISSN: 0378-7753.
 Publisher: Elsevier Science B.V..

AB $\text{LiCo}_x\text{Mn}_{2-x}\text{O}_4$ ($x = 0, 1/9, 1/6$) powders have been synthesized by an
 oxalate pptn. method. Single-phase spinel $\text{LiCo}_x\text{Mn}_{2-x}\text{O}_4$ is formed at
 temps. as low as 450° . FTIR anal. shows that the spinel
 powder prepd. at 600° has better phase quality than the
 powder prepd. at 750° by a conventional solid-state reaction.
 X-ray diffraction and thermogravimetric anal.-DTA show phase
 transition and impurity phase formation at three temps. It is also
 found that spinel phase stability increases with increase in Co
 content. The effects of Co content on the spinel **lattice**
const., high-temp. stability, transition temp. and capacity

on cycling are investigated.

IT **172960-08-6**, Cobalt lithium manganese oxide
(Co_{0.11}LiMn_{1.89}O₄) **172960-09-7**, Cobalt lithium manganese
oxide (Co_{0.17}LiMn_{1.83}O₄)
(prepn. and characterization of spinel LiCo_xMn_{2-x}O₄ by oxalate
pptn. for use as **cathode** in lithium-ion
batteries)

RN 172960-08-6 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.11}LiMn_{1.89}O₄) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.11	7440-48-4
Mn	1.89	7439-96-5
Li	1	7439-93-2

RN 172960-09-7 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.17}LiMn_{1.83}O₄) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.17	7440-48-4
Mn	1.83	7439-96-5
Li	1	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST cobalt lithium manganese oxide spinel prepn oxalate pptn;
cathode cobalt lithium manganese oxide **battery**

IT **Battery cathodes**

(prepn. and characterization of spinel LiCo_xMn_{2-x}O₄ by oxalate
pptn. for use as **cathode** in lithium-ion
batteries)

IT 12057-17-9, Lithium manganese oxide (LiMn₂O₄) **172960-08-6**,
Cobalt lithium manganese oxide (Co_{0.11}LiMn_{1.89}O₄)
172960-09-7, Cobalt lithium manganese oxide
(Co_{0.17}LiMn_{1.83}O₄)

(prepn. and characterization of spinel LiCo_xMn_{2-x}O₄ by oxalate
pptn. for use as **cathode** in lithium-ion
batteries)

lithium transition metal composite oxide for nonaqueous electrolyte secondary battery. Hosoya, Yosuke (Sony Corporation, Japan). Eur. Pat. Appl. EP 1154503 A1 20011114, 30 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-110980 20010507. PRIORITY: JP 2000-139152 20000511.

AB A nonaq. electrolyte cell having improved cyclic characteristics at elevated temps. includes a pos. electrode, a neg. electrode and a nonaq. electrolyte. The pos. electrode contains, as a pos. electrode active material, a lithium transition metal composite oxide represented by the general formula $\text{LiCo}_x\text{Al}_y\text{B}_z\text{O}_2$ where A denotes at least one selected from the group consisting of Al, Cr, V, Mn and Fe, B denotes at least one selected from the group consisting of Mg and Ca and x, y and z are such that $0.9 \leq x < 1$, $0.001 \leq y \leq 0.05$ and $0.001 < z < 0.05$.

IT **372491-98-0P**, Cobalt lithium magnesium manganese oxide (Co0.98LiMg0.01Mn0.01O2)

(cathode active material contg. lithium transition metal composite oxide for nonaq. electrolyte secondary battery)

RN 372491-98-0 HCAPLUS

CN Cobalt lithium magnesium manganese oxide (Co0.98LiMg0.01Mn0.01O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.98	7440-48-4
Mn	0.01	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-48

ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 12190-79-3P, Cobalt lithium oxide colio2 345664-05-3P, Aluminum

cobalt lithium oxide (Al0.01Co0.99LiO2) 372491-78-6P, Aluminum

cobalt lithium magnesium oxide (Al0.03Co0.96LiMg0.01O2)

372491-79-7P, Aluminum cobalt lithium magnesium oxide

(Al0.05Co0.94LiMg0.01O2) 372491-80-0P, Aluminum cobalt lithium

magnesium oxide (Al0.07Co0.92LiMg0.01O2) 372491-81-1P, Aluminum

cobalt lithium magnesium oxide (Al0.1Co0.89LiMg0.01O2)

372491-82-2P, Aluminum cobalt lithium magnesium oxide

(Al0.01Co0.96LiMg0.03O2) 372491-83-3P, Aluminum cobalt lithium

magnesium oxide (Al0.01Co0.94LiMg0.05O2) 372491-84-4P, Aluminum

cobalt lithium magnesium oxide (Al0.01Co0.92LiMg0.07O2)

372491-85-5P, Aluminum cobalt lithium magnesium oxide

(Al0.01Co0.89LiMg0.1O2) 372491-87-7P, Chromium cobalt lithium

magnesium oxide ($\text{Cr}_{0.01}\text{Co}_{0.98}\text{LiMg}_{0.01}\text{O}_2$) 372491-88-8P, Chromium
 cobalt lithium magnesium oxide ($\text{Cr}_{0.03}\text{Co}_{0.96}\text{LiMg}_{0.01}\text{O}_2$)
 372491-89-9P, Chromium cobalt lithium magnesium oxide
 ($\text{Cr}_{0.05}\text{Co}_{0.94}\text{LiMg}_{0.01}\text{O}_2$) 372491-90-2P, Chromium cobalt lithium
 magnesium oxide ($\text{Cr}_{0.07}\text{Co}_{0.92}\text{LiMg}_{0.01}\text{O}_2$) 372491-91-3P, Chromium
 cobalt lithium magnesium oxide ($\text{Cr}_{0.1}\text{Co}_{0.89}\text{LiMg}_{0.01}\text{O}_2$)
 372491-92-4P, Aluminum calcium cobalt lithium oxide
 ($\text{Al}_{0.01}\text{Ca}_{0.01}\text{Co}_{0.98}\text{LiO}_2$) 372491-93-5P, Aluminum calcium cobalt
 lithium oxide ($\text{Al}_{0.01}\text{Ca}_{0.03}\text{Co}_{0.96}\text{LiO}_2$) 372491-94-6P, Aluminum
 calcium cobalt lithium oxide ($\text{Al}_{0.01}\text{Ca}_{0.05}\text{Co}_{0.94}\text{LiO}_2$)
 372491-95-7P, Aluminum calcium cobalt lithium oxide
 ($\text{Al}_{0.01}\text{Ca}_{0.07}\text{Co}_{0.92}\text{LiO}_2$) 372491-96-8P, Aluminum calcium cobalt
 lithium oxide ($\text{Al}_{0.01}\text{Ca}_{0.1}\text{Co}_{0.89}\text{LiO}_2$) 372491-97-9P, Cobalt lithium
 magnesium vanadium oxide ($\text{Co}_{0.98}\text{LiMg}_{0.01}\text{VO}_{0.01}\text{O}_2$)
372491-98-0P, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.98}\text{LiMg}_{0.01}\text{Mn}_{0.01}\text{O}_2$) 372491-99-1P, Cobalt iron lithium
 magnesium oxide ($\text{Co}_{0.98}\text{Fe}_{0.01}\text{LiMg}_{0.01}\text{O}_2$) 372492-00-7P, Aluminum
 cobalt lithium magnesium oxide ($\text{Al}_{0.01}\text{Co}_{0.98}\text{LiMg}_{0.01}\text{O}_2$)
 372492-00-7P, Aluminum cobalt lithium magnesium oxide
 ($\text{Al}_{0.01}\text{Co}_{0.98}\text{LiMg}_{0.01}\text{O}_2$)
 (cathode active material contg. lithium transition metal
 composite oxide for nonaq. electrolyte secondary battery)

L32 ANSWER 14 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 2001:595605 Document No. 135:183246 Lithium secondary battery cathode
 active materials and lithium secondary batteries with excellent
 high-temperature cycle characteristics. Fukuzawa, Tatsuhiko;
 Munakata, Fumio; Osawa, Yasuhiko; Tanjo, Yuji (Nissan Motor Co.,
 Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001223006 A2 20010817, 7
 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-30553
 20000208.

AB Cathode active materials having compn. formula $\text{LiI} + \text{XMn}_2 - \text{X} - \text{Y} - \text{ZAYBZO}_4 - \delta$
 (A = bivalent Mg, Ni, Cu, and/or Zn; B = trivalent Al, Cr,
 Fe, Co, Ga, and/or In) are claimed. Preferably, the values X, Y, Z,
 and δ in the compn. formula are $0 < X \leq 0.1$, $0 < Y \leq 0.1$,
 $0 < Z \leq 0.1$, and $0 < \delta \leq 0.5$, and
 furthermore $0 < X + Y + Z \leq 0.3$. Lithium secondary batteries
 comprising the claimed cathode active materials and carbon anodes
 are also claimed. Batteries with high charge-discharge capacity are
 obtained.

IT **355018-51-8P**, Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.05}\text{Li}_{1.1}\text{Mg}_{0.05}\text{Mn}_{1.8}\text{O}_{3.9}$)
 (cathode active material; lithium manganese mixed oxide cathodes
 for secondary batteries with excellent high-temp/ cycle
 characteristics)

RN 355018-51-8 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide
 ($\text{Co}_{0.05}\text{Li}_{1.1}\text{Mg}_{0.05}\text{Mn}_{1.8}\text{O}_{3.9}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	3.9	17778-80-2
Co	0.05	7440-48-4
Mn	1.8	7439-96-5
Mg	0.05	7439-95-4
Li	1.1	7439-93-2

- IC ICM H01M004-58
ICS H01M004-02; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- IT 355018-48-3P 355018-49-4P 355018-50-7P, Iron lithium magnesium manganese oxide (Fe0.05Li1.1Mg0.05Mn1.803.9) **355018-51-8P**, Cobalt lithium magnesium manganese oxide (Co0.05Li1.1Mg0.05Mn1.803.9) 355018-52-9P 355018-53-0P, Indium lithium magnesium manganese oxide (In0.05Li1.1Mg0.05Mn1.803.9) 355018-54-1P, Aluminum lithium manganese nickel oxide (Al0.09Li1.1Mn1.76Ni0.0503.9) 355018-55-2P, Aluminum copper lithium manganese oxide (Al0.07Cu0.06Li1.1Mn1.7703.9) 355018-56-3P, Aluminum lithium manganese zinc oxide (Al0.03Li1.1Mn1.79Zn0.0803.9) (cathode active material; lithium manganese mixed oxide cathodes for secondary batteries with excellent high-temp/ cycle characteristics)
- L32 ANSWER 15 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
2001:133985 Document No. 134:181065 Nonaqueous **electrolyte** secondary **batteries** with excellent charge-discharge characteristics. Morishima, Hideaki; Kadoma, Hitoshi; Kubo, Koichi; Yamada, Shuji (Toshiba Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2001052702 A2 20010223, 9 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1999-225490 19990809.
- AB The **batteries** comprise Li Mn oxide **cathode** active materials having $\beta \geq 6$, where $\beta = 537.6 + (a_0 - 8.398) + (R_2 - 2.1616R + 1.0955)$, a_0 (Å) = **lattice const.** of cubic Fd3m space group, and $R = I_{400}/I_{311}$, [I400 and I311 are diffractometry intensities at (400) and (311)]. The **batteries** show excellent charge-discharge characteristics by operation at a temp. slightly higher than room temp.
- IT **326859-55-6P**, Cobalt lithium manganese oxide (Co0.11Li1.06Mn1.8404) (nonaq. **electrolyte** secondary **batteries** with lithium manganese mixed oxides for excellent charge-discharge characteristics)
- RN 326859-55-6 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.11}Li_{1.06}Mn_{1.84}O₄) (9CI) (CA
INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.11	7440-48-4
Mn	1.84	7439-96-5
Li	1.06	7439-93-2

IC ICM H01M004-58

ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nonaq **electrolyte** lithium **battery**

cathode; lithium manganese oxide **cathode** nonaq
electrolyte

IT Secondary **batteries**

(lithium; nonaq. **electrolyte** secondary
batteries with lithium manganese mixed oxides for
excellent charge-discharge characteristics)

IT **Battery cathodes**

(nonaq. **electrolyte** secondary **batteries** with
lithium manganese mixed oxides for excellent charge-discharge
characteristics)

IT 255041-96-4P, Lithium manganese oxide (Li_{0.98}Mn_{2.02}O₄)

326859-54-5P, Aluminum lithium manganese oxide (Al_{0.1}Li_{1.07}Mn_{1.83}O₄)

326859-55-6P, Cobalt lithium manganese oxide

(Co_{0.11}Li_{1.06}Mn_{1.84}O₄) 326859-56-7P, Aluminum lithium manganese
oxide (Al_{0.21}Li_{0.98}Mn_{1.81}O₄)

(nonaq. **electrolyte** secondary **batteries** with
lithium manganese mixed oxides for excellent charge-discharge
characteristics)

L32 ANSWER 16 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN

2000:769633 Document No. 133:352622 **Cathode** active mass for
secondary nonaqueous **electrolyte batteries**, its

manufacture, and the **batteries**. Nakamura, Masaya;

Hasegawa, Osamu; Suzuki, Satoru; Numata, Koichi; Ishida, Shintaro
(Denso Co., Ltd., Japan; Mitsui Mining and Smelting Co., Ltd.).

Jpn. Kokai Tokkyo Koho JP 2000306577 A2 20001102, 28 pp.

(Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-189377 19990702.

PRIORITY: JP 1999-36427 19990215.

AB The **cathode** active mass is spinel type cryst. substituted

lithium manganese oxide, Li_{1+x}Mn_{2-x-y}MyO₄ (x ≥ 0, yr > 0), with

lattice const. a ≤ 8.230, ≤ 8.220,

≤ 8.220, ≤ 8.250, ≤ 8.240, ≤ 8.220 Å when

M = Mn, Al, Co, Fe, Mg, and Ca, resp., or Li_{1+x}Mn_{2-x-y-z}M₁Y₂ZO₄,

where $z > 0$, $M1 = \text{Mg, Fe, Ca, Sr, Ba, Y, La, Ti, Zr, Ni, Cu, and/or Ag, and } M2 = \text{Al, Co, V, Cr, and/or Ga.}$ The active mass may have its surface treated with oxalic acid, malonic acid, or succinic acid. The active mass is prepd. by mixing a Li compd. and a Mn compd. with Ni, Al, Co, Fe, Mg, Ca, and/or their compds., sintering the mixt., and cooling; or mixing the sintered material with a soln. of the org. acid and drying. The sintered material may be mixed with an addnl. Li compd., Ti, V, W, Mo, and/or their compds., and sintered again.

IT **171827-60-4P**, Cobalt lithium manganese oxide (Co0.25LiMn1.75O4) **172960-09-7P**, Cobalt lithium manganese oxide (Co0.17LiMn1.83O4) **305365-14-4P**, Cobalt lithium manganese oxide (Co0.1Li1.03Mn1.87O4) **305365-15-5P**, Cobalt lithium manganese oxide (Co0.1Li1.05Mn1.85O4) **305365-16-6P**, Cobalt lithium manganese oxide (Co0.05Li1.08Mn1.87O4) **305365-17-7P**, Cobalt lithium manganese oxide (Co0.1Li1.08Mn1.82O4) **305365-18-8P**, Cobalt lithium manganese oxide (Co0.1Li1.12Mn1.78O4) **305365-19-9P**, Cobalt lithium manganese oxide (Co0.35LiMn1.65O4) **305365-20-2P**, Cobalt lithium manganese oxide (Co0.1Li1.15Mn1.75O4) **305365-21-3P**, Cobalt lithium manganese oxide (Co0.17Li1.12Mn1.71O4) **305365-51-9P**, Cobalt lithium magnesium manganese oxide (Co0.22LiMg0.01Mn1.76O4) **305365-52-0P**, Cobalt lithium magnesium manganese oxide (Co0.2LiMg0.02Mn1.78O4) **305365-53-1P**, Cobalt lithium magnesium manganese oxide (Co0.18LiMg0.03Mn1.79O4) **305365-54-2P**, Cobalt lithium magnesium manganese oxide (Co0.14LiMg0.05Mn1.81O4) **305365-55-3P**, Cobalt lithium magnesium manganese oxide (Co0.08LiMg0.08Mn1.84O4) **305365-56-4P**, Cobalt lithium magnesium manganese oxide (Co0.03LiMg0.1Mn1.87O4) (comps. and manuf. of substituted lithium manganese oxides with controlled **lattice const.** for lithium **battery cathodes**)

RN 171827-60-4 HCAPLUS
CN Cobalt lithium manganese oxide (Co0.25LiMn1.75O4) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Co	0.25	7440-48-4
Mn	1.75	7439-96-5
Li	1	7439-93-2

RN 172960-09-7 HCAPLUS
CN Cobalt lithium manganese oxide (Co0.17LiMn1.83O4) (9CI) (CA INDEX NAME)

NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.17	7440-48-4
Mn	1.83	7439-96-5
Li	1	7439-93-2

RN 305365-14-4 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.1Li1.03Mn1.87O4) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.87	7439-96-5
Li	1.03	7439-93-2

RN 305365-15-5 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.1Li1.05Mn1.85O4) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.85	7439-96-5
Li	1.05	7439-93-2

RN 305365-16-6 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.05Li1.08Mn1.87O4) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.05	7440-48-4
Mn	1.87	7439-96-5
Li	1.08	7439-93-2

RN 305365-17-7 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.1Li1.08Mn1.82O4) (9CI) (CA

INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.82	7439-96-5
Li	1.08	7439-93-2

RN 305365-18-8 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.1Li1.12Mn1.78O4) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.78	7439-96-5
Li	1.12	7439-93-2

RN 305365-19-9 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.35LiMn1.65O4) (9CI) (CA INDEX
 NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.35	7440-48-4
Mn	1.65	7439-96-5
Li	1	7439-93-2

RN 305365-20-2 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.1Li1.15Mn1.75O4) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.75	7439-96-5
Li	1.15	7439-93-2

RN 305365-21-3 HCAPLUS
 CN Cobalt lithium manganese oxide (Co0.17Li1.12Mn1.71O4) (9CI) (CA

INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.17	7440-48-4
Mn	1.71	7439-96-5
Li	1.12	7439-93-2

RN 305365-51-9 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.22LiMg0.01Mn1.76O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.22	7440-48-4
Mn	1.76	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

RN 305365-52-0 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.2LiMg0.02Mn1.78O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.2	7440-48-4
Mn	1.78	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 305365-53-1 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.18LiMg0.03Mn1.79O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.18	7440-48-4
Mn	1.79	7439-96-5
Mg	0.03	7439-95-4
Li	1	7439-93-2

RN 305365-54-2 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.14LiMg0.05Mn1.81O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.14	7440-48-4
Mn	1.81	7439-96-5
Mg	0.05	7439-95-4
Li	1	7439-93-2

RN 305365-55-3 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.08LiMg0.08Mn1.84O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.08	7440-48-4
Mn	1.84	7439-96-5
Mg	0.08	7439-95-4
Li	1	7439-93-2

RN 305365-56-4 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.03LiMg0.1Mn1.87O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.03	7440-48-4
Mn	1.87	7439-96-5
Mg	0.1	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-48
 ICS C01G053-00; H01M004-02; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST secondary lithium **battery cathode** active mass
 manuf; **battery cathode** substituted lithium
 manganese oxide compn; succinic acid lithium manganese oxide
battery cathode; malonic acid lithium manganese
 oxide **battery cathode**; oxalic acid lithium

manganese oxide **battery cathode; lattice**
const substituted lithium manganese oxide **cathode**

IT **Battery cathodes**

Crystal structure

(compns. and manuf. of substituted lithium manganese oxides with
 controlled **lattice const.** for lithium

battery cathodes)

- IT 136479-29-3P, Calcium lithium manganese oxide (Ca_{0.1}LiMn_{1.90}O₄)
 136479-33-9P, Lithium magnesium manganese oxide (LiMg_{0.3}Mn_{1.70}O₄)
 136479-39-5P, Lithium magnesium manganese oxide (Li_{1.1}Mg_{0.1}Mn_{1.80}O₄)
 136479-43-1P, Lithium magnesium manganese oxide (LiMg_{0.1}Mn_{1.90}O₄)
 147787-62-0P, Lithium manganese nickel oxide (LiMn_{1.9}Ni_{0.10}O₄)
 171827-58-0P, Aluminum lithium manganese oxide (Al_{0.25}LiMn_{1.75}O₄)
171827-60-4P, Cobalt lithium manganese oxide
 (Co_{0.25}LiMn_{1.75}O₄) 171827-63-7P, Lithium manganese nickel oxide
 (LiMn_{1.75}Ni_{0.25}O₄) **172960-09-7P**, Cobalt lithium manganese
 oxide (Co_{0.17}LiMn_{1.83}O₄) 172960-16-6P, Lithium manganese nickel
 oxide (LiMn_{1.83}Ni_{0.17}O₄) 176902-43-5P, Lithium manganese nickel
 oxide (LiMn_{1.7}Ni_{0.30}O₄) 197313-65-8P, Aluminum lithium manganese
 oxide (Al_{0.17}LiMn_{1.83}O₄) 206115-27-7P, Iron lithium manganese
 oxide (Fe_{0.25}LiMn_{1.75}O₄) 211235-82-4P, Lithium magnesium manganese
 oxide (LiMg_{0.25}Mn_{1.75}O₄) 224782-06-3P, Lithium magnesium manganese
 oxide (LiMg_{0.17}Mn_{1.83}O₄) 267225-95-6P, Aluminum lithium manganese
 oxide (Al_{0.1}Li_{1.05}Mn_{1.85}O₄) 305365-00-8P, Lithium manganese nickel
 oxide (Li_{1.03}Mn_{1.87}Ni_{0.10}O₄) 305365-01-9P, Lithium manganese nickel
 oxide (Li_{1.05}Mn_{1.85}Ni_{0.10}O₄) 305365-02-0P, Lithium manganese nickel
 oxide (Li_{1.08}Mn_{1.87}Ni_{0.05}O₄) 305365-03-1P, Lithium manganese
 nickel oxide (Li_{1.08}Mn_{1.82}Ni_{0.15}O₄) 305365-04-2P, Lithium
 manganese nickel oxide (Li_{1.1}Mn_{1.8}Ni_{0.10}O₄) 305365-05-3P, Lithium
 manganese nickel oxide (Li_{1.12}Mn_{1.78}Ni_{0.10}O₄) 305365-07-5P,
 Aluminum lithium manganese oxide (Al_{0.1}Li_{1.03}Mn_{1.87}O₄)
 305365-08-6P, Aluminum lithium manganese oxide
 (Al_{0.05}Li_{1.08}Mn_{1.87}O₄) 305365-09-7P, Aluminum lithium manganese
 oxide (Al_{0.1}Li_{1.08}Mn_{1.82}O₄) 305365-10-0P, Aluminum lithium
 manganese oxide (Al_{0.1}Li_{1.12}Mn_{1.78}O₄) 305365-11-1P, Aluminum
 lithium manganese oxide (Al_{0.35}LiMn_{1.65}O₄) 305365-12-2P, Aluminum
 lithium manganese oxide (Al_{0.1}Li_{1.15}Mn_{1.75}O₄) 305365-13-3P,
 Aluminum lithium manganese oxide (Al_{0.17}Li_{1.12}Mn_{1.71}O₄)
305365-14-4P, Cobalt lithium manganese oxide
 (Co_{0.1}Li_{1.03}Mn_{1.87}O₄) **305365-15-5P**, Cobalt lithium
 manganese oxide (Co_{0.1}Li_{1.05}Mn_{1.85}O₄) **305365-16-6P**, Cobalt
 lithium manganese oxide (Co_{0.05}Li_{1.08}Mn_{1.87}O₄) **305365-17-7P**
 , Cobalt lithium manganese oxide (Co_{0.1}Li_{1.08}Mn_{1.82}O₄)
305365-18-8P, Cobalt lithium manganese oxide
 (Co_{0.1}Li_{1.12}Mn_{1.78}O₄) **305365-19-9P**, Cobalt lithium
 manganese oxide (Co_{0.35}LiMn_{1.65}O₄) **305365-20-2P**, Cobalt
 lithium manganese oxide (Co_{0.1}Li_{1.15}Mn_{1.75}O₄) **305365-21-3P**
 , Cobalt lithium manganese oxide (Co_{0.17}Li_{1.12}Mn_{1.71}O₄)

305365-22-4P, Iron lithium manganese oxide (Fe0.1Li1.03Mn1.87O4)
305365-23-5P, Iron lithium manganese oxide (Fe0.17LiMn1.83O4)
305365-24-6P, Iron lithium manganese oxide (Fe0.1Li1.05Mn1.85O4)
305365-25-7P, Iron lithium manganese oxide (Fe0.05Li1.08Mn1.87O4)
305365-26-8P, Iron lithium manganese oxide (Fe0.1Li1.08Mn1.82O4)
305365-27-9P, Iron lithium manganese oxide (Fe0.1Li1.12Mn1.78O4)
305365-28-0P, Iron lithium manganese oxide (Fe0.35LiMn1.65O4)
305365-29-1P, Iron lithium manganese oxide (Fe0.1Li1.15Mn1.75O4)
305365-30-4P, Iron lithium manganese oxide (Fe0.17Li1.12Mn1.71O4)
305365-31-5P, Lithium magnesium manganese oxide
(Li1.03Mg0.1Mn1.87O4) 305365-32-6P, Lithium magnesium manganese
oxide (Li1.05Mg0.1Mn1.85O4) 305365-33-7P, Lithium magnesium
manganese oxide (Li1.08Mg0.05Mn1.87O4) 305365-34-8P, Lithium
magnesium manganese oxide (Li1.08Mg0.1Mn1.82O4) 305365-35-9P,
Lithium magnesium manganese oxide (Li1.12Mg0.1Mn1.78O4)
305365-36-0P, Calcium lithium manganese oxide (Ca0.1Li1.03Mn1.87O4)
305365-37-1P, Calcium lithium manganese oxide (Ca0.17LiMn1.83O4)
305365-38-2P, Calcium lithium manganese oxide (Ca0.1Li1.05Mn1.85O4)
305365-39-3P, Calcium lithium manganese oxide (Ca0.25LiMn1.75O4)
305365-40-6P, Calcium lithium manganese oxide (Ca0.05Li1.08Mn1.87O4)
305365-41-7P, Calcium lithium manganese oxide (Ca0.1Li1.08Mn1.82O4)
305365-42-8P, Calcium lithium manganese oxide (Ca0.1Li1.1Mn1.8O4)
305365-43-9P, Calcium lithium manganese oxide (Ca0.1Li1.12Mn1.78O4)
305365-44-0P, Calcium lithium manganese oxide (Ca0.3LiMn1.7O4)
305365-45-1P 305365-46-2P 305365-47-3P 305365-48-4P
305365-49-5P 305365-50-8P **305365-51-9P**, Cobalt lithium
magnesium manganese oxide (Co0.22LiMg0.01Mn1.76O4)
305365-52-0P, Cobalt lithium magnesium manganese oxide
(Co0.2LiMg0.02Mn1.78O4) **305365-53-1P**, Cobalt lithium
magnesium manganese oxide (Co0.18LiMg0.03Mn1.79O4)
305365-54-2P, Cobalt lithium magnesium manganese oxide
(Co0.14LiMg0.05Mn1.81O4) **305365-55-3P**, Cobalt lithium
magnesium manganese oxide (Co0.08LiMg0.08Mn1.84O4)
305365-56-4P, Cobalt lithium magnesium manganese oxide
(Co0.03LiMg0.1Mn1.87O4) 305365-57-5P, Aluminum iron lithium
manganese oxide (Al0.24Fe0.01LiMn1.76O4) 305365-58-6P, Aluminum
iron lithium manganese oxide (Al0.22Fe0.02LiMn1.76O4)
305365-59-7P, Aluminum iron lithium manganese oxide
(Al0.21Fe0.03LiMn1.76O4) 305365-60-0P, Aluminum iron lithium
manganese oxide (Al0.19Fe0.05LiMn1.76O4) 305365-61-1P, Aluminum
iron lithium manganese oxide (Al0.14Fe0.09LiMn1.77O4)
305365-62-2P, Aluminum iron lithium manganese oxide
(Al0.11Fe0.11LiMn1.78O4) 305365-63-3P, Aluminum iron lithium
manganese oxide (Al0.07Fe0.15LiMn1.78O4) 305365-64-4P, Cobalt iron
lithium manganese oxide (Co0.24Fe0.01LiMn1.76O4) 305365-65-5P,
Cobalt iron lithium manganese oxide (Co0.22Fe0.02LiMn1.76O4)
305365-66-6P, Cobalt iron lithium manganese oxide
(Co0.21Fe0.03LiMn1.76O4) 305365-67-7P, Cobalt iron lithium

- manganese oxide ($\text{Co}_{0.19}\text{Fe}_{0.05}\text{LiMn}_{1.76}\text{O}_4$) 305365-68-8P, Cobalt iron lithium manganese oxide ($\text{Co}_{0.14}\text{Fe}_{0.09}\text{LiMn}_{1.77}\text{O}_4$) 305365-69-9P, Cobalt iron lithium manganese oxide ($\text{Co}_{0.11}\text{Fe}_{0.11}\text{LiMn}_{1.78}\text{O}_4$) 305365-70-2P, Cobalt iron lithium manganese oxide ($\text{Co}_{0.07}\text{Fe}_{0.15}\text{LiMn}_{1.78}\text{O}_4$) (comps. and manuf. of substituted lithium manganese oxides with controlled **lattice const.** for lithium **battery cathodes**)
- IT 110-15-6, Succinic acid, uses 141-82-2, Malonic acid, uses 144-62-7, Oxalic acid, uses (substituted lithium manganese oxides with org. acid treated surface for lithium **battery cathodes**)
- L32 ANSWER 17 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN 2000:601230 Document No. 133:269362 O2 structure $\text{Li}_{2/3}[\text{Ni}_{1/3}\text{Mn}_{2/3}]\text{O}_2$: a new layered **cathode** material for rechargeable lithium **batteries**. III. Ion exchange. Paulsen, J. M.; Larcher, D.; Dahn, J. R. (Department of Physics, Dalhousie University, Halifax, NS, B3H 3J5, Can.). Journal of the Electrochemical Society, 147(8), 2862-2867 (English) 2000. CODEN: JESQAN. ISSN: 0013-4651. Publisher: Electrochemical Society.
- AB The ion exchange of Li for Na in P2-structure $\text{Na}_{2/3}[\text{Ni}_{1/3}\text{Mn}_{2/3}]\text{O}_2$ to make T2-structure $\text{Li}_{2/3}[\text{Ni}_{1/3}\text{Mn}_{2/3}]\text{O}_2$ is studied. Electron micrographs show that the hexagonal plate-like crystal habit is preserved during ion exchange. Ion exchange is successful and equiv. using both molten salts and concd. Li^+ -contg. aq. solns. By controlling the Li:Na ratio in the ion exchange, it is possible to prep. an intermediate phase of approx. compn. $\text{Li}_{1/3}\text{Na}_{1/3}[\text{Ni}_{1/3}\text{Mn}_{2/3}]\text{O}_2$, where filled alkali layers of Li and Na alternate, thus doubling the **c axis** of the material. A summary of ion-exchange reactions of Li for Na in other layered Na-bronzes, such as $\text{P3-Na}_{2/3}[\text{Ni}_{1/3}\text{Mn}_{2/3}]\text{O}_2$, $\text{O3-Na}[\text{Ni}_{1/2}\text{Mn}_{1/2}]\text{O}_2$, $\text{P2-Na}_{2/3}[\text{Co}_x\text{Mn}_{1-x}]\text{O}_2$, $\text{P3-Na}_{2/3}[\text{Co}_x\text{Mn}_{1-x}]\text{O}_2$, $\text{P2-Na}_{2/3}\text{CoO}_2$, $\text{P2-Na}_{2/3}[\text{Fe}_{1/3}\text{Mn}_{2/3}]\text{O}_2$, $\text{P2-Na}_{2/3}[\text{Fe}_{2/3}\text{Mn}_{1/3}]\text{O}_2$, $\text{P2-Na}_{2/3}[\text{Mg}_{1/3}\text{Mn}_{2/3}]\text{O}_2$, $\text{P2-Na}_{2/3}[\text{Ni}_{1/3}\text{Mn}_{2/3}]\text{O}_2$, and O3-NaMnO_2 , is given.
- IT **214536-41-1P**, Cobalt lithium manganese oxide (structure, compn. and properties of lithium nickel manganese oxide layered **cathode** material prepd. by ion exchange for rechargeable lithium **batteries**)
- RN 214536-41-1 HCAPLUS
- CN Cobalt lithium manganese oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Co	x	7440-48-4

- | | | | | |
|----|--|---|--|-----------|
| Mn | | x | | 7439-96-5 |
| Li | | x | | 7439-93-2 |
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 75
- ST **battery cathode** lithium nickel manganese oxide;
ion exchange sodium nickel manganese oxide
- IT **Battery cathodes**
Cation exchange
Crystal morphology
Scanning electron microscopy
X-ray diffraction
(structure, compn. and properties of lithium nickel manganese
oxide layered **cathode** material prepd. by ion exchange
for rechargeable lithium **batteries**)
- IT 259190-87-9P, Lithium Manganese nickel oxide $\text{Li}_{0.67}\text{Mn}_{0.67}\text{Ni}_{0.33}\text{O}_2$
(structure, compn. and properties of lithium nickel manganese
oxide layered **cathode** material prepd. by ion exchange
for rechargeable lithium **batteries**)
- IT 12438-58-3, Manganese sodium oxide MnNaO_2 114986-73-1, Cobalt
sodium oxide $\text{CoNa}_{0.67}\text{O}_2$ 151248-87-2, Manganese nickel sodium oxide
213533-03-0, Cobalt manganese sodium oxide 285978-95-2, Manganese
nickel sodium oxide $\text{Mn}_{0.67}\text{Ni}_{0.33}\text{Na}_{0.67}\text{O}_2$ 285979-03-5, Manganese
nickel sodium oxide $\text{Mn}_{0.5}\text{Ni}_{0.5}\text{NaO}_2$ 289912-56-7, Nickel sodium
titanium oxide $\text{Ni}_{0.33}\text{Na}_{0.67}\text{Ti}_{0.67}\text{O}_2$ 297173-40-1, Iron manganese
sodium oxide ($\text{Fe}_{0.33}\text{Mn}_{0.67}\text{Na}_{0.67}\text{O}_2$) 297173-41-2, Iron manganese
sodium oxide ($\text{Fe}_{0.67}\text{Mn}_{0.33}\text{Na}_{0.67}\text{O}_2$) 297173-43-4, Magnesium
manganese sodium oxide ($\text{Mg}_{0.33}\text{Mn}_{0.67}\text{Na}_{0.67}\text{O}_2$)
(structure, compn. and properties of lithium nickel manganese
oxide layered **cathode** material prepd. by ion exchange
for rechargeable lithium **batteries**)
- IT 12162-79-7P, Lithium manganese oxide LiMnO_2 12190-79-3P, Cobalt
lithium oxide CoLiO_2 128975-24-6P, Lithium manganese nickel oxide
 $\text{LiMn}_{0.5}\text{Ni}_{0.5}\text{O}_2$ **214536-41-1P**, Cobalt lithium manganese
oxide 297173-39-8P, Lithium manganese nickel sodium oxide
($\text{Li}_{0.33}\text{Mn}_{0.67}\text{Ni}_{0.33}\text{Na}_{0.33}\text{O}_2$) 297173-44-5P, Iron lithium manganese
oxide ($\text{Fe}_{0.33}\text{Li}_{0.67}\text{Mn}_{0.67}\text{O}_2$) 297173-47-8P, Lithium magnesium
manganese oxide ($\text{Li}_{0.67}\text{Mg}_{0.33}\text{Mn}_{0.67}\text{O}_2$)
(structure, compn. and properties of lithium nickel manganese
oxide layered **cathode** material prepd. by ion exchange
for rechargeable lithium **batteries**)

L32 ANSWER 18 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
2000:522635 Document No. 133:107448 Secondary nonaqueous
electrolyte batteries. Fujiwara, Masashi; Yamada,
Shuji (Toshiba Corp., Japan). Jpn. Tokkyo Koho JP 3032757 B1
20000417, 13 pp. (Japanese). CODEN: JTXXFF. APPLICATION: JP
1999-39762 19990218.

AB Secondary Li **batteries** use **cathodes** composed of agglomerated secondary particles of **c axis oriented** primary $\text{Li}_x\text{M}_1-\text{yM}'\text{yFzO}_{2n-z}$ ($\text{M} = \text{Co}, \text{Ni}, \text{and/or Mn}$; $\text{M}' = \text{Co}, \text{Ni}, \text{Mn}, \text{b}, \text{and/or Al}$; $0.9 \leq x \leq 1.1$; $\text{yr} \leq 0.5$; $z \leq 0.25$, $1 \leq n \leq 2$) particles having $10 \leq D/r \leq 50$, where r is the av. length of the primary particles in their shorter direction and D is the diam. of the secondary particle at 50% count on its integrated vol. based particle size distribution curve.

IT **130811-82-4**, Cobalt lithium manganese oxide ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) (**cathode** active mass with controlled primary and secondary particle size for secondary lithium **batteries**)

RN 130811-82-4 HCAPLUS

CN Cobalt lithium manganese oxide ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Co	0.2	7440-48-4
Mn	1.8	7439-96-5
Li	1	7439-93-2

IC ICM H01M004-58
ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery cathode** particle size

IT **Battery cathodes**
Particle size
(**cathode** active mass with controlled primary and secondary particle size for secondary lithium **batteries**)

IT 12031-65-1, Lithium nickel oxide (LiNiO_2) 12057-17-9, Lithium manganese oxide (LiMn_2O_4) 130811-80-2, Lithium manganese nickel oxide ($\text{LiMn}_{1.8}\text{Ni}_{0.2}\text{O}_4$) **130811-82-4**, Cobalt lithium manganese oxide ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) 163596-49-4, Lithium manganese nickel oxide ($\text{LiMn}_{0.2}\text{Ni}_{0.8}\text{O}_2$) 198195-73-2, Aluminum lithium manganese oxide ($\text{Al}_{0.02}\text{LiMn}_{1.98}\text{O}_4$) 198195-81-2, Lithium manganese borate oxide ($\text{LiMn}_{1.98}(\text{BO}_3)_0.02\text{O}_{3.94}$) 200498-99-3, Lithium nickel fluoride oxide ($\text{Li}_{1.05}\text{Ni}_{0.95}\text{F}_{0.05}\text{O}_{1.95}$) 237081-98-0, Cobalt lithium nickel oxide ($\text{Co}_{0.17}\text{LiNi}_{0.83}\text{O}_2$) 282117-60-6, Aluminum cobalt lithium nickel oxide ($\text{Al}_{0.02}\text{Co}_{0.17}\text{LiNi}_{0.81}\text{O}_2$) 282117-61-7, Cobalt lithium nickel borate oxide ($\text{Co}_{0.17}\text{LiNi}_{0.81}(\text{BO}_3)_0.02\text{O}_{1.94}$) 282117-62-8, Cobalt lithium nickel fluoride oxide ($\text{Co}_{0.17}\text{Li}_{1.05}\text{Ni}_{0.81}\text{F}_{0.05}\text{O}_{1.95}$) 282117-63-9, Cobalt lithium manganese nickel oxide ($\text{Co}_{0.17}\text{LiMn}_{0.02}\text{Ni}_{0.81}\text{O}_2$) 282117-64-0

Co		0.05		7440-48-4
Mn		1.9		7439-96-5
Mg		0.05		7439-95-4
Li		1		7439-93-2

RN 256637-62-4 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.1LiMg0.1Mn1.8O4) (9CI)
 (CA INDEX NAME)

Component		Ratio		Component Registry Number
=====				
O		4		17778-80-2
Co		0.1		7440-48-4
Mn		1.8		7439-96-5
Mg		0.1		7439-95-4
Li		1		7439-93-2

RN 256637-63-5 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.15LiMg0.15Mn1.7O4)
 (9CI) (CA INDEX NAME)

Component		Ratio		Component Registry Number
=====				
O		4		17778-80-2
Co		0.15		7440-48-4
Mn		1.7		7439-96-5
Mg		0.15		7439-95-4
Li		1		7439-93-2

RN 256637-64-6 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide
 (Co0.05Li1.02Mg0.05Mn1.88O4) (9CI) (CA INDEX NAME)

Component		Ratio		Component Registry Number
=====				
O		4		17778-80-2
Co		0.05		7440-48-4
Mn		1.88		7439-96-5
Mg		0.05		7439-95-4
Li		1.02		7439-93-2

RN 256637-65-7 HCAPLUS
 CN Cobalt lithium magnesium manganese oxide (Co0.1Li1.06Mg0.1Mn1.74O4)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.74	7439-96-5
Mg	0.1	7439-95-4
Li	1.06	7439-93-2

RN 256637-66-8 HCAPLUS

CN Cobalt lithium magnesium manganese oxide (Co0.1Li1.09Mg0.1Mn1.71O4)
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.71	7439-96-5
Mg	0.1	7439-95-4
Li	1.09	7439-93-2

IC ICM H01M004-58

ICS H01M010-40

ICA H01M004-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT **256637-61-3**, Cobalt lithium magnesium manganese oxide
(Co0.05LiMg0.05Mn1.9O4) **256637-62-4**, Cobalt lithium
magnesium manganese oxide (Co0.1LiMg0.1Mn1.8O4) **256637-63-5**
, Cobalt lithium magnesium manganese oxide (Co0.15LiMg0.15Mn1.7O4)
256637-64-6, Cobalt lithium magnesium manganese oxide
(Co0.05Li1.02Mg0.05Mn1.88O4) **256637-65-7**, Cobalt lithium
magnesium manganese oxide (Co0.1Li1.06Mg0.1Mn1.74O4)
256637-66-8, Cobalt lithium magnesium manganese oxide
(Co0.1Li1.09Mg0.1Mn1.71O4)
(compns. of substituted lithium manganese oxide cathode active
mass for secondary lithium batteries)

L32 ANSWER 21 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN

1999:412884 Document No. 131:76211 Secondary lithium batteries and
products using the batteries. Kasai, Masahiro; Dozono, Toshinori
(Hitachi, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 11176441 A2
19990702 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1997-344663 19971215.

AB The batteries comprise cathode active materials comprising
spinel-structured $\text{Li}_{1+x}\text{Mn}_2\text{-xO}_4$ ($0 < x < 1.33$) and 0.01-10 mol%
additives other than Li, Mn, and O (preferably B, P, Mg, As, Sb, Zr,
Na, Be, Y, Si, Al, C, F, Bi, Pb, Ge, and/or Sn), that are optionally

heat treated at 400-900°. Active materials of (A) $\text{Li}_1 + x\text{Mn}_{2-x-y}\text{O}_4$ ($0 < x < 1.33$; $0 < y < 2$; $M \geq 1$ transition metals other than Mn) and 0.01-10 mol% additives other than Li, Mn, and O, (B) $\text{Li}_1 + x\text{Mn}_{2-x-y-z}\text{BzO}_4$ ($0 < x < 1.33$; $0 < y + z < 2$; $M \geq 1$ transition metals other than Mn; $B \geq 1$ elements other than Li, Mn, and M), or (C) $(\text{Li}, A)_1 + x\text{Mn}_{2-x-y-z}\text{BzO}_4$ ($0 < x < 1.33$; $0 < y + z < 2$; $M \geq 1$ transition metals other than Mn; $A = \text{Mg, Zn, Fe, Cu, and/or Ni}$; $B \geq 1$ elements other than Li, Mn, and M). Portable phones, portable videos camera, personal computers, domestic elec. appliances, elec. power storage systems, and elec. cars using the secondary lithium batteries as power sources are also claimed.

- IT **229173-80-2**, Cobalt lithium magnesium manganese oxide ($\text{Co}_0.1\text{Li}_1.1\text{Mg}_0.15\text{Mn}_1.65\text{O}_4$) (lithium manganese oxide contg. additives as secondary battery cathode active materials)
- RN 229173-80-2 HCAPLUS
- CN Cobalt lithium magnesium manganese oxide ($\text{Co}_0.1\text{Li}_1.1\text{Mg}_0.15\text{Mn}_1.65\text{O}_4$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.65	7439-96-5
Mg	0.15	7439-95-4
Li	1.1	7439-93-2

- IC ICM H01M004-58
ICS H01M004-02; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- IT 132001-60-6, Lithium manganese oxide ($\text{Li}_1 - 2.33\text{Mn}_1.67 - 2\text{O}_4$)
229173-80-2, Cobalt lithium magnesium manganese oxide ($\text{Co}_0.1\text{Li}_1.1\text{Mg}_0.15\text{Mn}_1.65\text{O}_4$) (lithium manganese oxide contg. additives as secondary battery cathode active materials)
- L32 ANSWER 22 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
1997:174784 Document No. 126:174227 Active material for positive **electrodes** in lithium piles, solid-state and sol-gel process for its manufacture, and the lithium piles obtained. Amine, Khalil; Yasuda, Hideo; Fujita, Yuko (Japan Storage Battery Co Ltd, Japan). Fr. Demande FR 2733632 A1 19961031, 27 pp. (French). CODEN: FRXXBL. APPLICATION: FR 1996-5027 19960422. PRIORITY: JP 1995-127275 19950426.
- AB The active material has general formula $\text{Li}_x\text{Mn}_{2-y}\text{MyO}_4$ ($M = \text{divalent metal}$; $0.45 \leq y \leq 0.60$; $1 \leq x \leq 2.1$) and

cubic spinel structure having **lattice const.** $\leq 8.190 \text{ \AA}$. The active material is manufd. by firing a mixt. of the Li compd., Mn compd., and metal compd., and refiring the material ≥ 1 times after pressing. Alternatively, the Li compd., Mn compd., and metal compd. are dissolved in an alc. or water, adding NH_4OH , and firing the gel obtained. Alternatively, the active material is manufd. by prepg. a compd. having general formula $\text{LiMn}_2\text{-yMyO}_4$ (M and y as above), and mixing the compd. with a soln. of LiI or BuLi . The Li piles comprise a pos. **electrode** of the above material and a neg. **electrode** selected from Li, Li alloys, C, and graphite. The active material may have general formula $\text{Li}_x\text{Mn}_2\text{-zMzO}_4$ (M = trivalent metal selected from Fe, Ni, Al, Co, B, and V; x as above; $0.5 \leq z \leq 1$).

IT 12016-89-6P, Cobalt lithium manganese oxide
 187156-13-4P, Cobalt lithium manganese oxide
 ($\text{Co}_{0.5}\text{-1Li}_{1\text{-}2.1}\text{Mn}_{1\text{-}1.5}\text{O}_4$)
 (solid-state and sol-gel process for manufg. active material for pos. **electrodes** in lithium piles)

RN 12016-89-6 HCAPLUS
 CN Cobalt lithium manganese oxide (CoLiMnO_4) (7CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	1	7440-48-4
Mn	1	7439-96-5
Li	1	7439-93-2

RN 187156-13-4 HCAPLUS
 CN Cobalt lithium manganese oxide ($\text{Co}_{0.5}\text{-1Li}_{1\text{-}2.1}\text{Mn}_{1\text{-}1.5}\text{O}_4$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.5 - 1	7440-48-4
Mn	1 - 1.5	7439-96-5
Li	1 - 2.1	7439-93-2

IC ICM H01M004-40
 ICS H01M004-08; H01M004-26
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST lithium manganese nickel oxide **electrode**; pos **electrode** lithium pile

- IT Carbon black, uses
(inhibitor and stabilizer; solid-state and sol-gel process for
manufg. active material for pos. **electrodes** in lithium
piles)
- IT Gelatins, uses
(inhibitors and stabilizers; solid-state and sol-gel process for
manufg. active material for pos. **electrodes** in lithium
piles)
- IT Secondary **batteries**
(solid-state and sol-gel process for manufg. active material for
pos. **electrodes** in lithium piles)
- IT Alcohols, uses
(solvents; solid-state and sol-gel process for manufg. active
material for pos. **electrodes** in lithium piles)
- IT lithium alloy
(neg. **electrodes**; solid-state and sol-gel process for
manufg. active material for pos. **electrodes** in lithium
piles)
- IT 7439-93-2, Lithium, uses
(**batteries**; solid-state and sol-gel process for manufg.
active material for pos. **electrodes** in)
- IT 9002-89-5, Poly(vinyl alcohol)
(inhibitor and stabilizer; solid-state and sol-gel process for
manufg. active material for pos. **electrodes** in lithium
piles)
- IT 7782-42-5, Graphite, uses
(neg. **electrodes**; solid-state and sol-gel process for
manufg. active material for pos. **electrodes** in lithium
piles)
- IT 12016-89-6P, Cobalt lithium manganese oxide 12031-75-3P,
Lithium manganese nickel oxide ($\text{Li}_2\text{Mn}_3\text{NiO}_8$) 53027-29-5P, Iron
lithium manganese oxide 61179-01-9P, Aluminum lithium manganese
oxide 133782-19-1P, Lithium manganese vanadium oxide
153327-02-7P, Boron lithium manganese oxide 162684-16-4P, Lithium
manganese nickel oxide 187155-98-2P, Lithium manganese nickel
oxide ($\text{Li}_{1.03}\text{Mn}_{1.5}\text{Ni}_{0.504}$) 187156-01-0P, Lithium manganese nickel
oxide ($\text{Li}_{0.99}\text{Mn}_{1.5}\text{Ni}_{0.504}$) 187156-03-2P, Lithium manganese nickel
oxide ($\text{Li}_{2.08}\text{Mn}_{1.5}\text{Ni}_{0.504}$) 187156-07-6P, Lithium manganese nickel
oxide ($\text{Li}_{2.02}\text{Mn}_{1.5}\text{Ni}_{0.504}$) 187156-09-8P, Lithium manganese zinc
oxide 187156-11-2P, Iron lithium manganese oxide
($\text{Fe}_{0.5-1}\text{Li}_{1-2.1}\text{Mn}_{1-1.504}$) 187156-13-4P, Cobalt lithium
manganese oxide ($\text{Co}_{0.5-1}\text{Li}_{1-2.1}\text{Mn}_{1-1.504}$)
(solid-state and sol-gel process for manufg. active material for
pos. **electrodes** in lithium piles)
- IT 109-72-8, Butyllithium, processes 373-02-4, Nickel acetate
598-62-9, Manganese carbonate 638-38-0, Manganese acetate
640-67-5, Manganese oxalate 1310-65-2, Lithium hydroxide
3251-96-5, Manganese formate 7785-87-7, Manganese sulfate

- 7790-69-4, Lithium nitrate 10060-26-1, Manganese citrate
 10377-51-2, Lithium iodide 13138-45-9, Nickel nitrate
 14284-89-0, Manganese acetylacetonate 19664-95-0, Manganese
 butyrate
 (solid-state and sol-gel process for manufg. active material for
 pos. **electrodes** in lithium piles)
- IT 64-17-5, Ethanol, uses
 (solvent; solid-state and sol-gel process for manufg. active
 material for pos. **electrodes** in lithium piles)
- L32 ANSWER 23 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
 1996:618193 Document No. 125:253081 Manganese mixed oxides, their
 manufacture, and secondary lithium **battery**
cathodes from them. Okada, Masaki; Yoshida, Setsuo (Tosoh
 Corp, Japan). Jpn. Kokai Tokkyo Koho JP 08217452 A2 19960827
 Heisei, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
 1995-47924 19950214.
- AB The spinel $\text{LiM}_x\text{Mn}_{2-x}\text{O}_4$ (I; $\text{M} = \text{Ni, Co, Fe, and/or Cr; } 0.0 < x$
 ≤ 0.5) particles, having diam. $\leq 10 \mu\text{m}$ and BET sp.
 surface area $\geq 1 \text{ m}^2/\text{g}$, are manufd. by firing mixts. contg.
 (1) $\gamma\text{-MnO}_2$ having BET sp. surface area 150-500 m^2/g , (2) Li
 compds., and (3) Ni, Co, Fe, and/or Cr materials, preferably at
 $\leq 500^\circ$ followed by at $500\text{-}850^\circ$. I may have
lattice const. $< 8.24 \text{ \AA}$. The Li compds. may be
 LiNO_3 , and the metal materials may be nitrates of Ni, Co, Fe, and/or
 Cr. Secondary Li **batteries** using **anodes** from
 Li, Li alloys, or Li-intercalatable compds., and **cathodes**
 from the acicular I are also claimed.
- IT **130811-82-4P**, Cobalt Lithium Manganese oxide
 ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) **146956-26-5P**, Cobalt Lithium Manganese
 oxide ($\text{Co}_{0.1}\text{LiMn}_{1.9}\text{O}_4$)
 (firing in manuf. of metal-contg. Li Mn oxide for Li
battery cathodes)
- RN 130811-82-4 HCAPLUS
 CN Cobalt lithium manganese oxide ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) (9CI) (CA INDEX
 NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.2	7440-48-4
Mn	1.8	7439-96-5
Li	1	7439-93-2

- RN 146956-26-5 HCAPLUS
 CN Cobalt lithium manganese oxide ($\text{Co}_{0.1}\text{LiMn}_{1.9}\text{O}_4$) (9CI) (CA INDEX
 NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.9	7439-96-5
Li	1	7439-93-2

- IC ICM C01G045-00
ICS C01G049-00; C01G051-00; C01G053-00; H01M004-02; H01M004-58;
H01M010-36; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
- ST lithium manganese oxide **battery cathode**; firing
manganese oxyhydroxide lithium nitrate; manganese oxide lithium
nitrate firing; nickel lithium manganese oxide **cathode**;
cobalt lithium manganese oxide **cathode**; iron lithium
manganese oxide **cathode**; chromium lithium manganese oxide
cathode
- IT **Cathodes**
(**battery**, firing in manuf. of metal-contg. Li Mn oxide
for Li **battery cathodes**)
- IT **130811-82-4P**, Cobalt Lithium Manganese oxide
(Co_{0.2}LiMn_{1.8}O₄) **130917-43-0P**, Chromium Lithium Manganese oxide
(Cr_{0.2}LiMn_{1.8}O₄) **146956-26-5P**, Cobalt Lithium Manganese
oxide (Co_{0.1}LiMn_{1.9}O₄) **147787-62-0P**, Lithium Manganese Nickel
oxide (LiMn_{1.9}Ni_{0.1}O₄) **147812-19-9P**, Iron Lithium Manganese oxide
(Fe_{0.1}LiMn_{1.9}O₄)
(firing in manuf. of metal-contg. Li Mn oxide for Li
battery cathodes)
- IT **1313-13-9**, Manganese oxide (MnO₂), processes **7790-69-4**, Lithium
nitrate **10103-47-6**, Chromium nitrate **10141-05-6**, Cobalt nitrate
13138-45-9, Nickel nitrate **14104-77-9**, Iron nitrate
(firing in manuf. of metal-contg. Li Mn oxide for Li
battery cathodes)
- L32 ANSWER 24 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
1996:618192 Document No. 125:253080 Acicular manganese mixed oxides,
their manufacture, and secondary lithium **battery**
cathodes from them. Okada, Masaki; Yoshida, Setsuo (Tosoh
Corp, Japan). Jpn. Kokai Tokkyo Koho JP 08217451 A2 19960827
Heisei, 13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1995-47923 19950214.
- AB The spinel LiM_xMn_{2-x}O₄ (I; M = Ni, Co, Fe, and/or Cr; 0 < x
≤ 0.5) are manufd. by firing mixts. contg. (1) acicular
γ-MnO₂H or β-MnO₂, (2) Li compds., and (3) Ni, Co, Fe,
and/or Cr materials, preferably at ≤ 500° under atm.

followed by at 500-850°. I may have **lattice const.** $<8.24 \text{ \AA}$, and BET sp. surface area 5-10 m²/g. The Li compds. may be LiNO₃, and the metal materials may be nitrates of Ni, Co, Fe, and/or Cr. Secondary Li **batteries** using **anodes** from Li, Li alloys, or Li-intercalatable compds., and **cathodes** from the acicular I are also claimed.

IT 130811-82-4P, Cobalt Lithium Manganese oxide (Co_{0.2}LiMn_{1.8}O₄) 146956-26-5P, Cobalt Lithium Manganese oxide (Co_{0.1}LiMn_{1.9}O₄) 146956-27-6P, Cobalt Lithium Manganese oxide (Co_{0.3}LiMn_{1.7}O₄)
(firing in manuf. of metal-contg. acicular Li Mn oxide for Li **battery cathodes**)

RN 130811-82-4 HCAPLUS
CN Cobalt lithium manganese oxide (Co_{0.2}LiMn_{1.8}O₄) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.2	7440-48-4
Mn	1.8	7439-96-5
Li	1	7439-93-2

RN 146956-26-5 HCAPLUS
CN Cobalt lithium manganese oxide (Co_{0.1}LiMn_{1.9}O₄) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.1	7440-48-4
Mn	1.9	7439-96-5
Li	1	7439-93-2

RN 146956-27-6 HCAPLUS
CN Cobalt lithium manganese oxide (Co_{0.3}LiMn_{1.7}O₄) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	4	17778-80-2
Co	0.3	7440-48-4
Mn	1.7	7439-96-5
Li	1	7439-93-2

- IC ICM C01G045-00
ICS C01G049-00; C01G051-00; C01G053-00; H01M004-02; H01M004-58;
H01M010-36; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
- ST lithium manganese oxide **battery cathode**; firing
manganese oxyhydroxide lithium nitrate; manganese oxide lithium
nitrate firing; nickel lithium manganese oxide **cathode**;
cobalt lithium manganese oxide **cathode**; iron lithium
manganese oxide **cathode**; chromium lithium manganese oxide
cathode
- IT **Cathodes**
(**battery**, firing in manuf. of metal-contg. acicular Li
Mn oxide for Li **battery cathodes**)
- IT **130811-82-4P**, Cobalt Lithium Manganese oxide
(Co_{0.2}LiMn_{1.8}O₄) 130917-43-0P, Chromium Lithium Manganese oxide
(Cr_{0.2}LiMn_{1.8}O₄) **146956-26-5P**, Cobalt Lithium Manganese
oxide (Co_{0.1}LiMn_{1.9}O₄) **146956-27-6P**, Cobalt Lithium
Manganese oxide (Co_{0.3}LiMn_{1.7}O₄) 147787-62-0P, Lithium Manganese
Nickel oxide (LiMn_{1.9}Ni_{0.1}O₄) 147812-19-9P, Iron Lithium Manganese
oxide (Fe_{0.1}LiMn_{1.9}O₄) 176902-43-5P, Lithium Manganese Nickel
oxide (LiMn_{1.7}Ni_{0.3}O₄)
(firing in manuf. of metal-contg. acicular Li Mn oxide for Li
battery cathodes)
- IT 1313-13-9, Manganese oxide (MnO₂), processes 7790-69-4, Lithium
nitrate 10103-47-6, Chromium nitrate 10141-05-6, Cobalt nitrate
12025-99-9, Manganese oxide hydroxide (MnOOH) 13138-45-9, Nickel
nitrate 14104-77-9, Iron nitrate
(firing in manuf. of metal-contg. acicular Li Mn oxide for Li
battery cathodes)
- L32 ANSWER 25 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
1996:215367 Document No. 124:300804 Synthesis and electrochemical
studies of spinel phase LiMn₂O₄ **cathode** materials prepared
by the Pechini process. Liu, W.; Farrington, G. C.; Chaput, F.;
Dunn, B. (Dep. Materials Sci. Eng., Univ. Pennsylvania,
Philadelphia, PA, 19104, USA). Journal of the Electrochemical
Society, 143(3), 879-84 (English) 1996. CODEN: JES0AN. ISSN:
0013-4651. Publisher: Electrochemical Society.
- AB LiMn₂O₄-based spinels are of great interest as pos.
electrode materials for Li-ion **batteries**. The
authors describe what is believed to be the first synthesis of these
materials using the Pechini process, a low-temp. synthesis method
that often yields inorg. oxides of excellent phase purity and
well-controlled stoichiometry. By using this process, it was
possible to synthesize phase-pure cryst. spinel LiMn₂O₄ by calcining
the appropriate polymeric precursors in air at 250°C for
several hours. The influence of different firing temps. and the

effect of substituting a small amt. of Mn with Ni were also explored. Electrochem. studies show that the Pechini-synthesized materials offer not only high-quality performance but also significant anal. advantages which allow one to understand the structural mechanism of Li intercalation.

IT **176179-35-4P**, Lithium cobalt manganese oxide
($\text{LiCo}_0.04\text{Mn}_{1.96}\text{O}_4$) **176179-36-5P**, Lithium cobalt manganese
oxide ($\text{LiCo}_0.18\text{Mn}_{1.82}\text{O}_4$)
(lattice consts of various phases of
cathode materials)
RN 176179-35-4 HCAPLUS
CN Cobalt lithium manganese oxide ($\text{Co}_0.04\text{LiMn}_{1.96}\text{O}_4$) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Co	0.04	7440-48-4
Mn	1.96	7439-96-5
Li	1	7439-93-2

RN 176179-36-5 HCAPLUS
CN Cobalt lithium manganese oxide ($\text{Co}_0.18\text{LiMn}_{1.82}\text{O}_4$) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Co	0.18	7440-48-4
Mn	1.82	7439-96-5
Li	1	7439-93-2

CC 72-2 (Electrochemistry)
Section cross-reference(s): 52
ST synthesis electrochem spinel phase **cathode** material;
lithium manganese oxide **cathode** Pechini synthesis
IT Calcination
(calcination in synthesis of spinel phase LiMn_2O_4 **cathode**
materials)
IT **Cathodes**
(**battery**, synthesis and electrochem. studies of spinel
phase LiMn_2O_4 **battery cathode** materials
prepd. by the Pechini process)
IT 176179-33-2P, Lithium manganese nickel oxide ($\text{LiMn}_{1.96}\text{Ni}_{0.04}\text{O}_4$)
176179-34-3P, Lithium manganese nickel oxide ($\text{LiMn}_{1.82}\text{Ni}_{0.18}\text{O}_4$)
176179-35-4P, Lithium cobalt manganese oxide

(LiCo_{0.04}Mn_{1.96}O₄) **176179-36-5P**, Lithium cobalt manganese oxide (LiCo_{0.18}Mn_{1.82}O₄)

(**lattice const**s of various phases of **cathode** materials)

IT 12057-17-9P, Lithium manganese oxide (LiMn₂O₄)
(synthesis and electrochem. studies of spinel phase LiMn₂O₄ **cathode** materials prepd. by the Pechini process)

L32 ANSWER 26 OF 26 HCAPLUS COPYRIGHT 2004 ACS on STN
1994:34447 Document No. 120:34447 A study on LiM_xMn_{2-x}O₄ (M = cobalt, nickel, aluminum, titanium) as positive **electrode** materials for lithium secondary **batteries**. Bito, Y.; Murai, H.; Ito, S.; Hasegawa, M.; Toyoguchi, Y. (Energy Res. Lab., Matsushita Electr. Ind. Co., Ltd., Moriguchi, 570, Japan). Proceedings - Electrochemical Society, 93-23(Proceedings of the Symposium on New Sealed Rechargeable Batteries and Supercapacitors, 1993), 461-72 (English) 1993. CODEN: PESODO. ISSN: 0161-6374.

AB Substitution of Co, Ni, and Al for Mn in LiMn₂O₄ led to enhanced capacity of the material for use as intercalation **cathode** in Li **batteries**. The cycling voltage and current of LiM_xMn_{2-x}O₄ **cathodes** were affected by the **lattice const.** of the materials. Enhanced cycle characteristics can be obtained by small changes in **lattice const.** relative to the amt. of deintercalation of Li from the crystal on charging. In particular, LiCo_{0.2}Mn_{1.8}O₄ showed high capacity and excellent cycling characteristics.

IT **130811-82-4**, Cobalt lithium manganese oxide (Co_{0.2}LiMn_{1.8}O₄)
(**cathodes**, intercalation, crystal lattice and cycling capacity of, for lithium **battery**)

RN 130811-82-4 HCAPLUS

CN Cobalt lithium manganese oxide (Co_{0.2}LiMn_{1.8}O₄) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Co	0.2	7440-48-4
Mn	1.8	7439-96-5
Li	1	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST lithium transition metal manganese oxide; **cathode** lithium intercalation metal manganate

IT **Cathodes**
(**battery**, lithium transition metal manganese oxide, lithium-intercalating)

- IT 12057-17-9, Lithium manganese oxide (LiMn_2O_4) 130811-80-2, Lithium manganese nickel oxide ($\text{LiMn}_{1.8}\text{Ni}_{0.2}\text{O}_4$) **130811-82-4**, Cobalt lithium manganese oxide ($\text{Co}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) 145896-60-2, Aluminum lithium manganese oxide ($\text{Al}_{0.2}\text{LiMn}_{1.8}\text{O}_4$) 152013-71-3, Lithium manganese titanium oxide ($\text{LiMn}_{1.8}\text{Ti}_{0.2}\text{O}_4$)
(**cathodes**, intercalation, crystal lattice and cycling capacity of, for lithium **battery**)
- IT 7439-93-2, Lithium, reactions
(intercalation of, by transition metal manganese oxide **cathodes**, crystal lattice effect on)